THE

JOURNAL

OF

THE LINNEAN SOCIETY.

BOTANY.

VOL. XIV.

MISSOURI BOTANICAL GARDEN

LONDON:
SOLD AT THE SOCIETY'S APARTMENTS, BURLINGTON HOUSE;
AND BY
LONGMANS, GREEN, READER, AND DYER,
AND
WILLIAMS AND NORGATE.
1875.

PRINTED BY TAYLOR AND FRANCIS,
RED LION COURT, FLEET STREET.

LIST OF PAPERS.

Page

ARCHER, W., M.R.I.A.

Notes on some Collections made from Furnas Lake, Azores, containing Algæ and a few other Organisms 328

BAKER, J. G., Esq., F.L.S.

On the Recent Synonyms of Brazilian Ferns 12

Revision of the Genera and Species of Tulipeæ.............. 211

Revision of the Genera and Species of Asparagaceæ. (Plates XVII.–XX.) 508

BERKELEY, Rev. M. J., M.A., F.L.S.

Enumeration of the Fungi collected during the Expedition of H.M.S. 'Challenger,' Feb.–Aug. 1873...................... 350

BERKELEY, Rev. M. J., F.L.S., and C. E. BROOME, Esq., F.L.S.

Enumeration of the Fungi of Ceylon.—Part II., containing the remainder of the Hymenomycetes, with the remaining established tribes of Fungi. (Plates II.–X.) 29

BOLUS, HARRY, Esq., F.L.S.

Extract from a Letter of HARRY BOLUS, Esq., F.L.S., to J. D. HOOKER, M.D., C.B., Pres. R.S........................... 482

BROOME, C. E., Esq., F.L.S. (See BERKELEY, Rev. M. J.)

CLARKE, C. B., Esq., F.L.S.

On a new Genus in the Order Hydrocharidaceæ. (Plate I.) .. 8

On *Hieracium silhetense*, DC. 410

Notes on Indian Gentianaceæ 423

COLVILL, WILLIAM HENRY, Surgeon-Major, H.M. Indian Forces, Civil-Surgeon, Baghdad.

Some Observations on the Vegetable Productions and the Rural Economy of the Province of Baghdad...................... 399

Page

De Mello, J. C., of Campinas, Brazil.
On a Menispermaceous Plant, called by Velloz *Cissampelos Vitis,* figured in his 'Flora Fluminensis,' vol. x. tab. 137, without description. (Translated by J. Miers, Esq., F.R.S., V.P.L.S.) 4

Dickie, George, M.D., F.L.S., Prof. Bot. University of Aberdeen.
Note on the Buds developed on Leaves of *Malaxis* 1
On the Marine Algæ of Barbadoes. (Plate XI.) 146
Supplemental Note on Buds of *Malaxis.* (Plate XI.) 180
On the Algæ of Mauritius 190
On the Marine Algæ of St. Thomas and the Bermudas, and on *Halophila Baillonis,* Asch. 312
Enumeration of Algæ collected at the Cape-Verde Islands by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' .. 344
Enumeration of the Algæ collected at St. Paul's Rocks by H. N. Moseley, M.A., Naturalist to H.M.S., 'Challenger' 355
Enumeration of Algæ from Fernando de Noronha, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' .. 363
Enumeration of Algæ from 30 fathoms, at Barra Grande, near Pernambuco, Brazil, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' (Sept. 10th, 1873) 375
Enumeration of Algæ from Bahia, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' (Sept. 25th, 1873) 377
Algæ from Tristan d'Acunha, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' 384
Algæ from Inaccessible Island, near Tristan d'Acunha, collected by H. N. Moseley, M.A. 386

Dyer, W. T. Thiselton, M.A., B.Sc., F.L.S.
On the Perigynium and Seta of *Carex.* (Plate XII.) 154
Note on Mr. Moseley's Communication on Freshwater Algæ from the Azores 326

Gray, Asa, M.D., F.M.L.S.
Revision of the Genus *Symphoricarpus* 9
Note on *Nemacladus,* Nutt 28

Hooker, J. D., M.D., C.B., Pres. R.S., V.P.L.S., &c.
On the Subalpine Vegetation of Kilima Njaro, E. Africa 141
On *Hydnora americana,* R. Br. 182
On the Discovery of *Phylica arborea,* Thouars, a tree of Tristan d'Acunha, in Amsterdam Island, in the S. Indian Ocean with an Enumeration of the Phanerogams and Vascular Cryptogams of that Island and of St. Paul 474
Observations on some Indian Species of *Garcinia* 484

Page

HOWARD, JOHN ELIOT, Esq., F.L.S., &c.
On the Genus *Cinchona* 156

M'NAB, W. R., M.D.
Notes on the Development of the Perigynium in *Carex pulicaris*, Linn. 152

MASTERS, M. T., M.D., F.R.S., F.L.S.
Note on the Bracts of Crucifers 391
On the Restiaceæ of Thunberg's Herbarium 413
Remarks on the Structure, Affinities, and Distribution of the genus *Aristolochia*, with Descriptions of some hitherto unpublished Species 487
Monographic Sketch of the Durioneæ. (Plates XIV., XV., XVI.) 495

MERRIFIELD, Mrs.
Observations on the Fruit of *Nitophyllum versicolor* 421
Note on the above 632

MOSELEY, H. N., M.A., Naturalist to H.M.S. 'Challenger.'
On the Marine Algæ of St. Thomas and the Bermudas, and on *Halophila Baillonis*, Asch. 311
Notes on the Vegetation of Bermuda 317
Notes on Freshwater Algæ obtained at the Boiling Springs at Furnas, St. Michael's, Azores, and their Neighbourhood 321
Notes on Plants collected at St. Vincent, Cape-Verdes (July 27th to August 4th, 1873) 340
Notes on Plants collected at St. Paul's Rocks 354
Notes on Plants collected at Fernando de Noronha (Sept. 1st and 2nd, 1873) 359
Notes on Plants collected in the Islands of the Tristan d'Acunha group 377
On the Botany of Marion Island, Kerguelen's Land, and Yong Island of the Heard Group 387

OLIVER, Prof., F.R.S., F.L.S.
List of Plants collected by H. N. MOSELEY, M.A., on Kerguelen's Land, Marion Island, and Yong Island 389
Note on a Fruit from Comassi, collected by Lieut. DE HOGHTON and sent to Kew by Major BULGER 457

SALVIN, OSBERT, F.R.S.
Extracts from a Letter from OSBERT SALVIN, F.R.S., to Dr. HOOKER, V.P.L.S. 188

SHAW, Dr. JOHN, F.L.S.
On the Changes going on in the Vegetation of South Africa through the introduction of the Merino Sheep 202

Page

STIRTON, Dr. J.

Enumeration of the Lichens collected by H. N. MOSELEY, M.A., Naturalist to H.M.S. 'Challenger,' in the Islands of the Atlantic Ocean 366

Additions to the Lichen-flora of New Zealand 458

WEDDELL, H. A., M.D., F.M.L.S.

On a new African Genus of Podostemaceæ. (Plate XIII.) .. 208

INDEX 633

ERRATA.

Page 316, line 14 from top, *for* transverse-rugal *read* transverse rugæ.
— 346, — 15 from top, *for* PEYSSONNELIA *read* PEYSSONELIA.
— 348, — 2 from bottom, *for* fine *read* few.
— 363, — 20 from top, *for* BARTYNESIANA *read* BARTYRESIANA.
— 364, — 12 from top, *for* PEYSSOUNELIA *read* PEYSSONELIA.
— 386, — 2 from bottom, *for* OXYACANTHUS *read* OXYACANTHUM.
— 400, — 25 from top, for *Grapes* read *Grasses*.
— 402, — 4 from top, *for* Neja *read* Nejd.
— 403, — 7 from top, *for* four fifteenths *read* seven fifteenths.

Dates of publication of the several Numbers included in this volume.

No. 73,	pp. 1–64,	was published	October 9, 1873.
„ 74,	pp. 65–140	„	December 3, 1873.
„ 75,	pp. 141–207	„	April 25, 1874.
„ 76,	pp. 208–310	„	July 31, 1874.
„ 77,	pp. 311–390	„	October 17, 1874.
„ 78,	pp. 391–483	„	February 1, 1875.
„ 79,	pp. 484–546	„	April 24, 1875.
„ 80,	pp. 547–642	„	July 5, 1875.

THE JOURNAL

OF

THE LINNEAN SOCIETY.

Note on the Buds developed on Leaves of *Malaxis*. By George Dickie, M.D., F.L.S., Prof. Bot. University of Aberdeen.

[Read November 7, 1872.]

In this district, including the Counties of Kincardine, Aberdeen, and Banff, *Malaxis paludosa* may be considered rare: it was first observed, more than twenty years ago, by Mr. Barron on the eastern ascent to Lochnagar, near Her Majesty's Cottage at Altgusach; some years later it was reported to me as growing in Kincardine, in the parish of Strachan, same county; Mr. Sim, of Gateside Farm, found another station in 1871. Being in that quarter this season, 1872, I accompanied Mr. Sim to the place, as I had never seen the plant alive—my chief aim being to examine the buds developed on its leaves. The specimens were not in such good condition as could be desired; nevertheless it may be useful to report the result, as I am not aware of any previous details on the subject.

It is one of those five plants, in Britain at least, which are reported to have buds produced on the leaves. In *Malaxis* this seems an habitual character; in *Cardamine pratensis*, *Nasturtium officinale*, and *Drosera* such buds are occasional only.

The appendages in question are usually described as forming a fringe to the leaves; in the new edition of English Botany the statement is, "leaves often fringed with minute bulbules." The specimens examined by me had only a few on the margin near the tips of the leaves; most were on the upper surface near the apex; they were rather numerous and crowded together, two in some cases were coherent. I found each to consist of a flask-like

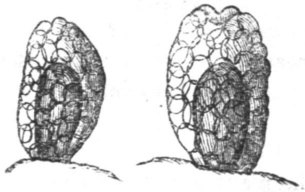
cellular sac of a green colour, and within it and near its base a yellowish-green nucleus-like body. The cellular bag has a narrow opening at the apex, in some apparently bilabiate, in others slightly undulate. The sacs at first contained air, which, by gentle pressure, escaped at the apex.

Any one accustomed to examine ovules of some of our native Orchids, for instance *Habenaria viridis*, could at once recognize a close resemblance between them and the buds of *Malaxis*.

My supply being limited and not in the best condition, I did not trace the mode of development; but, from the appearance of a few in which the sac was small in proportion to the contained nucleus, I think it likely that the latter precedes the development of the former. The accompanying figures give a fair idea of the buds, fig. 1 being, as I suppose, in an earlier stage than fig. 2; the sketches were made from fresh examples.

Professor Oliver has given me a reference to Irmisch's 'Beiträge zur Biologie und Morphologie der Orchideen,' 1853, plate iii.,

Fig. 1. Fig. 2.



where young buds (axillary) of *Microstylis monophylla* a.. figured, which somewhat resemble those of *Malaxis*—there being a central nucleus and a rudimentary sheathing leaf, looking like an ovular coat; I believe that *Malaxis* and *Microstylis* are nearly allied, the one being considered by some a subgenus of the other.

Such a case as now described seems to have a relation to two disputed points, viz. the homology of placenta and of ovule respectively.

Schleiden compared the ovule to a bud; and presuming that buds only grow upon the axis, he concluded that the part of the ovary (viz. the placenta) from which ovules are developed is necessarily an axis; but as buds, whether habitually or occasionally, are produced on the leaves of various plants, the conclusion of Schleiden has not been universally adopted. The generally received opinion

respecting the homology of the placenta is, that it corresponds to the leaf-margins, these in the carpellary leaf being infolded and coherent. Now, comparing the leaf-buds of *Malaxis* to ovules, some on the margin and others on the upper surface, there is a correspondence to ordinary placentation, as well as to such exceptional cases as *Nymphæa*, *Butomus*, &c.

There is still some difference of opinion respecting the true homology of the ovule itself. Brongniart, Godron, and others, having observed in various plants the ovary assuming the foliar type as an abnormal condition, on the placentæ of which there were seen all possible states intermediate between normal ovules and simple lobes of a leaf, concluded that ovules are homologues of leaf-lobes, at least in Umbelliferæ, Ranunculaceæ, Leguminosæ &c. Observations on a number of deformed ovules, as well as on their development in the normal condition, led M. C. Cramer to regard the ovule in Compositæ, Primulaceæ, &c. as only a metamorphosed leaf.

Ovules have also been compared to the marginal glands of certain leaves.

Lestiboudais describes the ovule as a phyllary expansion, the podosperm corresponding to the petiole, the outer coat to the leaf itself; the middle coat he considers an appendage to the outer, and compares it to that which surrounds the nectary at the base of the petals in *Ranunculus gramineus*, *R. aconitifolius &c.*

Some years ago I communicated to the Edinburgh Botanical Society (Transactions, vol. ii.) a full account of several remarkable monstrosities of *Gentiana campestris*, in some of which the ovary was transformed into a leaf and the ovules into buds.

It appears to me that the case of *Malaxis* indicates the homology of the ovule as that of a bud, the nucleus-like body corresponding to an axis; the cellular open-mouthed sac I would compare to an embracing leaf. This view may probably be confirmed when the order of development has been determined.

Finally I would compare the ovule to a bud, the nucleus corresponding to the axis, the coats, when two are present, being the homologues of two appendages (*i. e.* leaves) on two consecutive nodes.

On a Menispermaceous Plant, called by Velloz *Cissampelos Vitis*, figured in his 'Flora Fluminensis,' vol. x., tab. 137, without description. By J. C. De Mello, of Campinas, Brazil. (Translated by J. Miers, Esq., F.R.S., V.P.L.S.)

[Read November 7, 1872.]

When, in 1869, I had to reply to a letter from Mr. Bentham calling my attention to certain families of Brazilian plants, I forwarded to him under the name of *Odontocarya*, Miers*, a small specimen with ♂ flowers, of a species frequently met with near this town and in the neighbourhood of San Paulo. At that time I had not seen the female flowers or the fruit, and had no further knowledge of Velloz's plant. Having since then made diligent search for the ♀ plant, which is rare, I found at last, in January of this year, two specimens in fruit, when I ascertained that the plant, forwarded as above mentioned, is unquestionably the same as that figured by Velloz, and does not belong to the genus *Cissampelos*, as a mere inspection is sufficient to show, nor even to the genus *Odontocarya* of Mr. Miers (as I had supposed from the mode of disposition of its ♂ flowers, and also from my mistaken belief in the agglutination of the stamens for half their length), but with much greater probability to the *Burasaia* of Thouars, because the characters presented by the fruit are quite in accord with those assigned by Baillon and Miers (Benth. & Hook. Gen. Pl. i. 960). But as the characters presented by the ♂ flowers do not quite agree with those given in the diagnosis of that genus by Messrs. Bentham and Hooker in their 'Genera Plantarum,' p. 39, and, moreover, as I have not seen the ♀ flowers, which may perhaps prove to be different from those of *Burasaia*, until I have seen them I will not give a decided opinion as to the genus to which this plant belongs, but in the meanwhile I will keep it in that genus. As I cannot now send specimens of it, I will offer the following description.

Burasaia Vitis (Cissampelos Vitis, *Velloz l. supr. cit.*).

♂ Flowers.—*Sepals* 6, membranaceous, arranged in 2 series, the more exterior much smaller ($\frac{2}{3}$ less) than the inner; oval, subtriangular, the interior ones slightly imbricated in æstivation, elliptic, or scarcely obovate-elliptical, flat, subpatent, obtusely rounded at the apex, subacute at the base. *Petals* 6, equal, somewhat shorter than the larger sepals, 2-serial,

* See the Journal of the Linn. Soc., Bot. vol. xi. p. 253.

erect, or scarcely patent, sub-fleshy, concave, elliptic-oblong, remote at the apex, and obtusely sinuated, 3-denticulated. *Stamens* 6, erect, equal, conjoined only near the base (or by the torus?); *filaments* cylindrical, straight, thickish, equal in length to the petals, and twice the length of the anthers. *Anthers* terminal, continuous with the filaments, subglobose and bilocular, lobes thick, subcoriaceous, lateral, distinct, parallel, contiguous (connective invisible at the summit and middle of the lobes), and with a longitudinal furrow extending to the middle, opening longitudinally by a lateral fissure corresponding with the furrows.

♀ Flowers.—*Drupes* not stipitate, smooth and shining, with a rigidly fleshy pericarp, before it is ripe ellipsoid, when mature spherical, with a cicatrix of the style in the apex, not compressed while fresh: *putamen* subligneous, oval in shape, compressed anteriorly and posteriorly, terminated by a small subtriangular crest compressed on both sides, and covered by a mucilaginous glutinous pulp, externally slightly tuberculated, straight on the ventral side and almost flat, with a deep oblong hollow, with 4 lines of tubercles in linear series (2 on each side of the depression), convex on the dorsal face, with tubercles arranged so as to form irregular, somewhat oblique lines, with a narrow raised costate line down the middle, the inner cavity of the shell smooth, or with an oblong convex prominence caused by the external depression. *Seed* formed like the cavity; *testa* thinly membranaceous, deeply depressed on the side, and there only radiately sulcated, and inserted on the superior part of the prominence of the putamen: *albumen* thick, oleaginously fleshy; *embryo* slightly curved in the direction of the dorsal face of the albumen; *cotyledons* 2, thin, oblong-lanceolate, diverging at a right angle, or nearly so: *radicle* superior, not very short, and lodged in a small prominence on the upper face of the albumen.

Climbing shrubs, quite glabrous, filled with an aqueous yellowish bitter juice. *Stems* cylindrical, subligneous, the largest ½ inch (more or less) in diameter, bare below, climbing up small trees, and then dividing into many long terete *branches* (1–2 lines thick), tough, but easily cut through, and, after climbing up the trees which support them, hang down from the summit: the *outer bark* of the stem and older branches is lenticellately verruculose, shining, yellowish-green; *epiderm* rigidly membranaceous, readily pealing off in thin sheets of an obscure yellow colour: *younger branches* green, woody inside, yellowish, disposed in a regular zone round the central pith, the woody fascicles being separated by the medullary rays proceeding from the central pith*.

* The transverse section of a ripe stem much resembles that of *Somphoxylon Wullschlægelii*, Eichl., in Mart. 'Flora Brasil.' fasc. 33, tab. 5. fig. 1, with the difference that the medullary rays are broader than in it.

Leaves alternate, compound, 1-foliolate*, petiolated, subpeltate, remote, those on the lower branches 3 inches long, more or less; *petiole* cylindrical, 1–3½ inches long in the third or fourth lower leaves and the upper ones, thickened at the apex, evidently articulated with the blade, inserted in a concave cushion, which on drying becomes a slender margin surrounding the base of the petiole; *blade* 1–3 inches long, including the acumen, ¾–4 inches broad, submembranaceous, entire, digitately 7-nerved, oval or broadly oval, either truncated or cordiform at the base, with a broad and more or less deep sinus, decurrent along the thickened apex of the petiole, apex suddenly acuminated, mucronulate, acumen longer or shorter and always obtuse, seldom acute: *nerves* slightly prominent above, more prominent below, the 2 more external slender, placed near the margin of the base of the leaves, and terminating in it; the 5 other nerves are thicker, united at the base by a membranaceous web, as in the toes of a web-footed bird, the midrib has 4 or 6 lateral nervures, which are oblique, opposite or subopposite; the 4 lateral main nerves again branch on their lower side. *Inflorescence* a simple raceme, on a solitary, axillary, long, slender, cylindrical peduncle, furnished along its flowering portion with small irregular alternate nodules, which externally bear a small bract: *flowers* pedicellated, inserted on the nodules: ♂ *racemes* drooping, the largest 5 inches long, floriferous along their entire length (except at the base for an inch, more or less): *buds* globose, approximated, ½ line in diameter before opening: *corolla* rather less than a line in diameter, of a pale yellow or greenish colour: *flowers* pedicellated, in fascicles of 2 to 5, of different ages †: *pedicels* (secondary peduncles) slender, patent, straight, or variously curved, 1-flowered, somewhat less than a line long in the expanded flower; *bracts* linear, acutely subtriangular, ⅓ or ½ the length of the longer pedicels: ♀ *fructiferous racemes* pendent, the longest nearly 9 inches long, fructiferous along ⅔ or ¾ of the upper portion: *rachis* thicker than in the ♂ raceme; *pedicels* solitary, patently recurved, 2–3 lines long, terminating in a subglobose nodule, upon which rest 3 distinct *drupes* (sometimes only 1 or 2 by abortion); these are greenish before they become ripe, afterwards are of a reddish orange-colour, 3 lines in diameter ‡: *bracts* very small, like those of the ♂ plant. *Grows* in the virgin forests, or damp underwoods, preferring the neighbourhood of rivers or brooks. The ♂ plant flowers towards the

* The blade of the leaf is really articulated on the petiole, because after drying, the ripe leaves easily separate there.

† In all the fascicles, I found expanded flowers and buds in different stages of growth or age.

‡ The drupes, in the two specimens which I found in fruit, are smaller than those represented in the drawing of Velloz, in his plate 137, before quoted.

end of October or beginning of December; the fruit becomes ripe by the middle of January.

The principal difference which I perceive in the ♂ flowers of this Menispermaceous plant and those of the same sex in *Burasaia*, according to Messrs. Bentham and Hooker, as above quoted, is that in the former the more external sepals are much smaller than the internal ones, the petals are elliptic-oblong, the cells of the anthers are lateral, parallel, and contiguous in their whole length, and with a lateral dehiscence, the leaves are 1-foliolate; while in the three species of *Burasaia* from Madagascar, the exterior sepals are rather smaller than the internal ones, the petals oblong-oval, the anthers bilocular, introrse, the cells subparallel, contiguous only at their apex, and, lastly, with 3-foliolate leaves. But the differences just mentioned do not appear to me of sufficient importance to exclude the plant previously described from the genus *Burasaia*, with which the characters presented by the fruit seem quite in harmony: it is evident, however, that it belongs to the tribe *Tinosporeæ*, Hook. and Thoms. (Benth. and Hook., *l. c.* p. 31), because the cotyledons are divergent &c.; and as in that tribe there is no other genus in which it can be placed, except *Burasaia*, it would be absolutely necessary to create a new genus for it, which would be inadmissible, because the differences in the length of the exterior series of sepals, in regard to the interior whorl, the shape of the petals, the position of the anther-cells, the number of leaflets in each leaf, do not constitute characters of sufficient weight, and therefore can in no way serve as a basework for a diagnosis of such new genus.

In the meanwhile I will endeavour to procure the female flowers before I can pronounce definitely on the position of this plant.

Campinas, March 18, 1872.

Note by the Translator.

The above excellent description of the plant found by Senr de Mello shows that it is, beyond all doubt, the *Odontocarya acuparata*, nob., described in vol. iii. of my 'Contributions to Botany,' p. 61, and figured in plate 100: it will be seen that the foregoing details of Senr de Mello agree admirably with the description and figures I have given of the plant. That botanist was evidently not acquainted with the organization of the Madagascar genus *Burasaia*, and was very ill-informed by the authorities he quotes in regard to the structure of *Odontocarya*.—JOHN MIERS.

On a new Genus in the Order Hydrocharidaceæ.

By C. B. CLARKE, Esq., F.L.S.

[Read November 21, 1872.]

Ordo HYDROCHARIDACEÆ.

Tribus VALLISNERIEÆ.

Genus novum HYDROTROPHUS.

[Plate I.].

FLORES hermaphroditi. Perigonii tubus cum ovario connatus superne elongatus linearis; limbi foliola 3 exteriora sepaloidea oblonga vernatione valvata; foliola 2 interiora petaloidea alba augustiora longiora apice papillosa et torta. Styli 3 sepalis opposita; filamenta linearia: antheræ oblongæ laterales (fere *Ranunculi*): pollen læve sphæricum flavum. Styli 3 conico-lineares fistulosi, basi breviter connati, apice latere interiore stigmatoso. Ovarium 1-loculare ovali-oblongum superne productum: placentæ 3 parietales: ovula ∞ anatropa. Capsula indehiscens exsucca siliquæformis linearis viridis 2-pollicaris. Semina ∞ echinata utrinque spina longa munita (spinis inclusis 4–5 lin. longa): testa fere ossea. [Embryo erectus exalbuminosus, plumula in rima laterali abscondita?]

Planta acaulis annua in aquis placidis oryzetorum submersa: radix fibrosa limo adfixa. *Folia* auguste linearia debilia 2–4 ped. longa 2–5 lin. lata, marginibus sub lente minutissime denticulatis, apicibus immutatis super aquas natantibus. *Scapi* filiformes elongati 1–3-pedales, apice spatha lineari 4–12-pollicari, basi latere fissa superne fistulosa, terminati. *Flos* solitarius sessilis ad apicem scapi in rima spathæ inclusus tempore expansionis exsertus et ex aquis subemersus. Capsula spatha persistente involuta.

Species unica:—

HYDROTROPHUS ECHINOSPERMUS.

In oryzetis Bengaliæ orientalis (Zella Conulla): tempore pluviali, *i. e.* mensibus Aug.–Oct. florens.

EXPLICATIO TABULÆ.

1. Flos expansus verticaliter sectus.
2. Perigonii foliola exteriora viridia.

3. Perigonii foliola interiora albida.
4. Stamina.
5. Stigmata.
6. Flos diagrammatice expositus.
7. Ovarium junius transverse sectum.
8. Capsula (magnitudinis naturalis).
9. Semen.
10. Semen verticaliter sectum.

Figuræ 1–5, 7, 9, 10 ampliatæ.

Revision of the Genus *Symphoricarpus*.

By Asa Gray, M.D., F.M.L.S.

[Read December 5, 1872.]

The fruit of *Symphoricarpus* is not a "*bacca*," but a dipyrenous drupe formed from a quadrilocular ovary. The ovary, as is well known, has in two of its cells three or four infertile ovules, while the alternate (anterior and posterior) cells are uniovulate and fertile. These cells, in fructification, harden their lining into the bony coat which has been taken for testa, but within which at an early stage, or where the embryo has failed to develop, the seed may be seen suspended on its short funiculus. This is continued on the very thin and single seed-coat into the marginal raphe. In well-matured seeds this seed-coat adheres to the nucleus on the one side, and the bony endocarpial covering on the other.

Although this structure is readily enough made out, it appears to have escaped the notice of all botanists hitherto except Kunth. He, indeed, in the 'Nova Genera et Species,' characterizes the fruit as a "bacca;" but in the detailed description of *S. montanus* the case is rightly stated in the phrase, "*Semina endocarpio coriaceo loculos formante* undique et arcte obtecta...... Membrana propria seminis tenuissima, endospermio arcte adhærens." We ought here to have made out the structure in *Symphoricarpus* when in Torrey and Gray's 'Flora of N. America,' the drupaceous fruit of *Triosteum* was characterized, and the genus on this account set apart from the rest of the *Lonicereæ*. But we find that in the new 'Genera Plantarum,' the fruit even of *Triosteum* is said to be a berry—and that not through a loose popular use of the term; for the bony portion is called "*testa*," and the true seed-coat "*endopleura*," and the fruits of both *Sambucus* and *Viburnum* are particularly characterized as drupes.

The oversight in the 'Genera Plantarum' is remarkable, as Dr. Hooker had long since (in Journ. Linn. Soc. ii. p. 163) called attention to the fact that the ovule of *Caprifoliaceæ* has only a single coat. He may now have been misled by the terms and excellent figures given by Decaisne in the generally admirable 'Traité Général de Botanique,' in which the fruit even of the *Sambuceæ* is described as a berry (*baie*), and the endocarp as *testa*. Somehow Dr. Hooker must have either overlooked or doubted his former and correct determination, and so have written "*integumenta cum nucleo connata*" in the ordinal character, instead of *integumentum cum nucleo connatum*—although, by the way, the union is not universal.

Having had to reexamine the species of *Symphoricarpus*, the following is the result. From some differences observed in the length of stamens and style, dimorphism was suspected; but no evidence of it could be obtained.

SYMPHORICARPUS, Dill.

§ 1. *Boreales, campaniflori, nempe corolla aperte campanulata.*

* *Stylo barbato; fructibus rubris, floribusque parvis in axillis dense glomerato-spicatis; corolla fundo pl. m. glandulosa.*

1. S. VULGARIS, *Michx. cum syn. DC. Prodr.* S. spicatus, *Engelm. in Pl. Lindh.* ii. p. 215, *adnot.* W. New York to Arkansas and Texas.

** *Stylo glabro; fructibus niveis; spicis racemisve plerisque terminalibus brevibus vel foliatis interruptis nunc in axillis ad flores* 1–3 *reductis; corolla fundo nuda.*

2. S. OCCIDENTALIS, *R. Br. in Richards. App.* Robustus; corolla ultra medium 5-fida fauce villosissima; staminibus styloque præsertim exsertis.

Hab. Mainly west of the Mississippi and east of the Rocky Mountains, around the Upper Great Lakes and northward.

3. S. RACEMOSUS, *Michx.* Erectus, gracilior; corolla vix ad medium usque 5-fida, lobis versus basim villosis stamina subsuperantibus; stylo incluso.

Hab. From W. New York and Canada to the Pacific, and along the coast-range to below the middle of California.

Var. pauciflorus, *Robbins in Gray, Man.*, ed. 5. Humilis, diffusus, parvifolius; floribus paucis in spica terminali et subsolitariis in axillis.

Hab. From the mountains of Pennsylvania and Niagara to Oregon.

4. S. MOLLIS, *Nutt. in Torr. & Gray, Fl.* iii. p. 4. Humilis, diffusus, mollissime pubescens, fere velutinus, nunc glabratus; corolla late

campanulata intus glabella parceque pubescens vix ad medium 5-loba, lobis stamina adæquantibus; stylo brevi incluso.

Hab. California, common.

S. ciliatus, Nutt. *l. c.*, is a glabrate form.

§ 2. *Meridionales, tubiflori, nempe corolla pl. m. elongata, lobis tubo multo brevioribus, fundo striis 5 glandulosis instructo; floribus in axillis solitariis nunc ob folia ultima diminuta interrupte subspicatis.*

* *Stylo glabro; corollæ lobis latis.*

† *Mexicani, staminibus corollam adæquantibus.*

5. S. MICROPHYLLUS, *H. B. K.*, *Hook. Bot. Mag.* t. 4975. Glaber vel puberulus; corolla tubuloso-infundibulari, tubo intus infra stamina pubentissima lobis 4-plo longiore; staminibus corollam adæquantibus, filamentis antheris longioribus (fructibus, ex *Kunth*, albis, ex *Bot. Mag.* rubellis).—S. microphyllus, glaucescens (t. 294) *et* montanus (t. 295), *H., B., K. Nov. Gen. et Sp.* iii. p. 424, 425.

In reducing these three species of Kunth to one, Hooker adopted the least appropriate name, because of Willdenow's *Anisanthus microphylla*, incompletely published by Roemer & Schultes. The name *montanus* would have been better, that having been well figured both for flowers and fruit. The leaves are often an inch in length. The cultivated plant sometimes produces terminal racemes or spikes in the manner of *S. racemosus*.

†† *Colorado-Nevadenses; fructibus niveis; staminibus corolla brevioribus.*

6. S. ROTUNDIFOLIUS, *Gray, Pl. Wright.* ii. p. 66. Foliis orbiculatis oblongisve subcoriaceis ramulisque molliter pubescentibus nunc glabellis; corolla campanulato-infundibuliformi, tubo intus infra stamina pubescente seu villoso lobis 2–3-plo longiore; staminibus corollæ lobis brevioribus, filamentis anthera brevioribus vel æquilongis; pyrenis ovalibus utrinque obtusis.—S. montanus, *pro maxima parte, Wats. Bot. Kingd.* p. 132, *excl. syn.*

Hab. New Mexico, Utah, and Nevada.

The flowers of Wright's specimens on which this species was founded were very scanty and poor; upon reexamination I find that the corolla is not "glabrous" within, but pubescent towards the base, much less so, however, than in the specimens from Watson and others from Nevada and Utah. The corolla is only 3 or 4 lines long, in the latter specimens much broader than in the next species. In this species only some indications of dimorphism in the length of style and filaments may be discerned.

7. S. OREOPHILUS. Foliis ovalibus oblongisque glabris nunc molliter puberulis; corolla infundibulari-tubulosa, tubo intus glabro seu inferne parce pubescente, lobis 4–5-plo longiore, stylo duplo longiore; staminibus corollæ lobis brevioribus, filamentis antheræ æquilongis; pyrenis oblongis basi acuminatis.—S. montanus, *Gray in Enum. Pl. Parry*; *Sill. Journ.* xxxiv. p. 249; *Wats. l. c. pro parte.*

Hab. Rocky Mountains, Colorado Territory and New Mexico to the eastern side of the Sierra Nevada, California.

Corolla half an inch long, narrow. Nutlets of the fruit 3 lines long, much longer and flatter than in the preceding, and tapering at base to an acute point.

** *Stylo barbato; corollæ lobis oblongis.*

8. S. LONGIFLORUS, n. sp. Fere glaberrimus; foliis pallidis spathulato-oblongis crassiusculis parvis (semipollicaribus); corolla pæne hypocraterimorpha, tubo intus glaberrimo lobis oblongis 5-plo longiore stylo supra medium villoso duplo longiore; antheris linearibus subsessilibus fauce semiinclusis.

Hab. Pahranagat Mountains, in the south-eastern part of Nevada, *Miss Searls*, 1871.

Fruit unknown, corolla half an inch long, very narrow, white. A most distinct species.

On the Recent Synonyms of Brazilian Ferns.

By J. G. BAKER, Esq., F.L.S.

[Read January 16, 1873.]

DURING the last thirteen years four works have been published treating wholly or partially on the Ferns of Brazil, in which widely divergent views of their number and nomenclature have been taken. For two that have been written in England I have been to a large extent personally responsible. One of the four books which I have in view is the 'Synopsis Filicum' *, planned by Sir William Hooker, and carried out in detail after his death by myself. The plan of species-limitation followed in this was essentially the same as that adopted in Sir William Hooker's detailed 'Species Filicum,' and will be so well understood already by all who are likely to read this paper that it is quite needless for me to explain it. After the 'Synopsis Filicum' was completed, I was asked to undertake for the great 'Flora Brasiliensis' of Martius and Endlicher the two large suborders of *Filices*, Polypodiaceæ and Cyatheaceæ, which had not been previously treated. This I

* 'Synopsis Filicum,' by Sir W. J. Hooker and J. G. Baker. London: R. Hardwicke. Published in parts from July 1865 to April 1868.

did, and the fasciculus * containing these orders was published in May 1870. In this monograph I followed out the same plan of arrangement and species-limitation which Sir W. Hooker employed in the 'Species Filicum,' and began with in the 'Synopsis;' and in the two works, taken together, I have planned out according to this method and described all the Brazilian ferns once, and a large proportion of them twice over, once synoptically and again monographically. Many years before, the other suborders of *Filices*, Gleicheniaceæ, Hymenophyllaceæ, Marattiaceæ, Osmundaceæ, Schizæaceæ, and Ophioglossaceæ were monographed for the 'Flora Brasiliensis' by J. W. Sturm †, of Nuremberg. He followed a plan of species-limitation very different from ours; how different may be best explained by saying that he counts 49 Brazilian species of *Anemia* where we reckon only 20. In 1869, M. Fée, the veteran pteridologist of Strasburg, published an elaborate memoir in quarto, with 267 pages and 78 plates, entitled "Cryptogames Vasculaires du Brésil"‡. As will be readily understood by any one who is acquainted with M. Fée's previous fern-writings, he adopts and makes species upon a much more liberal scale than we are at all prepared to follow in this country. To take an extreme case, his estimate of the Brazilian *Cyatheas* is 19; mine is 4 species. In the present memoir he gives descriptions and figures of what he regards as new species, mentioning only names and stations for those previously described. His work did not reach me till several months after my own was printed off, the publication of the latter having been delayed in consequence of waiting for the Equisetaceæ and Marsileaceæ, which were undertaken by Milde and A. Braun. To a large extent I find that M. Fée and I have worked upon the same material; and we have both used freely an excellent set of specimens collected in the vicinity of Rio by Dr. Glaziou, Director of the Public Garden, who during the last few years has been exploring botanically the vicinity of the capital in a very thorough and energetic manner. Altogether M. Fée makes 182 new species; and as I cannot, in the new edition of 'Synopsis Filicum,' which I am at present engaged in preparing, adopt more than about ten per cent. of these, I thought that it would be better, seeing that I had not the opportunity of

* 'Flora Brasiliensis,' fasciculus 49. Cyatheaceæ and Polypodiaceæ. Leipsic: Fleischer. May, 1870.

† 'Flora Brasiliensis,' fasc. 23. Leipsic: July, 1859.

‡ 'Cryptogames Vasculaires du Brésil,' par A. L. A. Fée. Paris: Baillière and Masson. 1869.

citing his work in 'Flora Brasiliensis,' and should not have room, in accordance with the plan of 'Synopsis Filicum,' to quote it there, to go through it now in a separate paper, and at the same time to cite such of Sturm's species as were not adopted in 'Synopsis Filicum' under the plants to which we understand them to belong. Most of M. Fée's Polypodiaceæ gathered by Glaziou, which I am prepared to adopt, I had taken up and named already in 'Flora Brasiliensis.' Here of course he has the priority; and I will cite his specific names under the genera to which they fall, according to our plan of arrangement, sinking my own as synonyms. If for any reason another name for a plant is used in my part of 'Flora Brasiliensis' than that adopted in 'Synopsis Filicum,' I have cited that also; so that this paper is intended to be a full correlation of the synonyms of Brazilian ferns in the four works which I have mentioned, the name first mentioned being that which, according to my latest information, ought to be adopted, and those that follow to be cited as synonyms. These synonyms, though, I must not omit to explain, fall under two classes, which slide into one another so gradually, that I cannot venture to separate between them. In some cases I look upon M. Fée's new species as absolutely identical with plants previously described, which he has failed to recognize. For instance, there can be no possible doubt, upon examination of Dr. Glaziou's specimens, that Fée's *Cyathea mammillata* is identical with Hooker's *Gardneri*, his *Cyathea abruptecaudata* with *C. vestita* of Martius, his *Stenoloma Glazioui* with *Davallia bifida* of Kaulfuss, and his *Asplenium Serronii* with *A. pulchellum* of Raddi. These are all well-marked plants, not at all inclined to vary. Of course, living as he has done at a distance from any of the centres where botanical material is accumulated, M. Fée has worked at a great disadvantage as regards access to expensive books and to collections other than his own. This is forcibly brought out by the fact that in the present memoir he completely ignores Sturm's elaborate monograph—though, when he wrote, it had been published ten years, in a work so well known as the 'Flora Brasiliensis,' the most elaborate of all botanical descriptive writings.

In another large number of cases the difference between us means this, that characters which I have looked upon as marking individuals, M. Fee has looked upon as marking species. Conspicuous illustrations of this kind will be found in *Alsophila pruinata*, *A. paleolata*, *Nephrodium amplissimum*, and *Aspidium acu-*

leatum. Of Dr. Glaziou's fern-gatherings, three sets, to my knowledge, have come to Europe. The set which I used for 'Flora Brasiliensis' belonged to the late Dr. von Martius, and is now at Brussels, with the rest of the herbarium. When M. Fée left Strasburg to settle at Geneva, his whole collection of ferns was, I understand, purchased by the Emperor of Brazil, and has now been forwarded to Rio; so that these are not accessible to European botanists. We had no set originally sent to be retained in England; but when I learnt that M. Fée had founded so many species upon it, I applied direct to Dr. Glaziou himself; and he has most kindly and liberally taken great pains to send me as good a series of the numbers on which new species were founded as he could get together. This series is now deposited in the Kew herbarium, and, though by no means so complete as that at Brussels, yet contains a large proportion of the types; so that any one who cares to take the trouble can test for himself how far I am justified in rejecting as species so many of the proposed novelties.

Suborder I. GLEICHENIACEÆ.

GLEICHENIA

1. **G. LONGISSIMA, *Blume*=Mertensia Bancroftii, *Sturm*, p. 220.**

2. **G. PUBESCENS, *H., B., K.*=M. velata, longipinnata, nigropaleacea, remota, tomentosa, pubescens *and* pennigera, *Sturm*, p. 221–5; M. bifida *and* gracilis, *Sturm*, pp. 227–9; M. scalpturata, *Fee*, p. 199, t. 72. fig. 1; M. trifurcans, *Fée*, p. 201, t. 74. fig. 1.**

3. **G. REVOLUTA, *H., B., K.*=Mertensia angusta, pruinosa, revoluta *and* subflabellata, *Sturm*, p. 226–7.**

4. **G. DICHOTOMA, *Willd.* M. flexuosa, rigida (tab. 17), discolor, rufinervis, Schomburgkiana, *and* seminuda, *Sturm*, pp. 230–4; M. spissa, *Fée*, p. 200, tab. 73. fig. 2; M. squamosa, *Fée*, p. 202, tab. 72. fig. 2; M. latissima, p. 203, tab. 73. fig. 1.**

Var. M. nervosa, *Kaulf* (erroneously placed in 'Synopsis Filicum,' p. 15, under *pectinata*),=M. cinnamomea, neglecta, nervosa, *and* Beyrichiana, *Sturm*, p. 234–8.

Suborder II. HYMENOPHYLLACEÆ.

HYMENOPHYLLUM.

1. **H. ABRUPTUM, *Hook.*=H. brevifrons, *Sturm*, p. 283.**

2. H. crispum, *H., B., K.*=H. amœnum *and* Fendlerianum, *Sturm*, p. 291. (Fée's var. *brasiliana* I refer to *H. ciliatum.*)

3. H. polyanthos, *Sw.*=H. imbricatum, pusillum, protrusum, *and* Schomburgkii, *Sturm*, p. 287–290; H. Sturmii, *Fée*, p. 192; H. viridissimum, *Fée*, p. 194, tab. 49. fig. 3.

4. H. caudiculatum, *Mart.*=H. Martii, *Sturm*, p. 287.

5. H. hirsutum, *Sw.*=H. prionema, *Sturm*, p. 284? H. Raddianum, *Sturm*, p. 296; H. Wilsoni, *Fée*, p. 266, *non Hook.*

6. H. ciliatum, *Sw.*=H. Gardnerianum, *Sturm*, p. 297; H. crispum, var. brasiliana, *Fée*, p. 195, tab. 71. fig. 2; H. caulopteron, *Fée*, p. 197, tab. 70. fig. 3; H. microcarpon, *Fée*, p. 245, tab. 69. fig. 3 (name already occupied by Desvaux).

7. H. microcarpum, *Desv.*=H. organense, *Sturm*, p. 293; H. notabile, *Fée*, p. 193, tab. 69. fig. 2.

8. H. valvatum, *H. & G.*=H. producens, *Fée*, p. 196, tab. 71. fig. 4.

9. H. sericeum, *Sw.*=H. chrysothrix *and* plumosum, *Sturm*, p. 298–300; H. rufum, *Fée*, p. 198, tab. 70. fig. 4.

10. H. lineare, *Sw.*=H. elegans *and* Moritzianum, *Sturm*, p. 294–5; H. Wilsoni, *Fée*, p. 193, *non Hook.*

11. H. tunbridgense, *Sm.*=H. megachilum, *Sturm*, p. 286. (*H. Wilsoni*, Fée, is in part *lineare* and in part *hirsutum.*)

12. H. fucoides, *Sw.*=H. podocarpum, *Fée*, p. 196, tab. 71. fig. 3.

13. H. magellanicum, *Willd.*=H. ectocarpum, *Fée*, p. 266, sed vix *Fée, Foug. Ant.* p. 115, tab. 31. fig. 1.

Trichomanes.

1. T. heterophyllum, *H., B., K.*=T. Spruceanum, *Sturm*, p. 246.

2. T. muscoides, *Sw.*=T. Hookeri, *Sturm*, 251; T. Kapplerianum, *Sturm*, p. 276; T. Pabstianum, *Sturm*, p. 279.

3. T. krausii, *H. & G.*=T. acrocarpon, *Fée*, p. 188, tab. 70. fig. 1.

4. T. sinuosum, *Rich.*=T. Serricula, *Fée*, p. 189, tab. 68. fig. 3.

5. T. brachypus, *Kunze.*=T. tanaicum, Ankersii, commutatum, *and* guianense, *Sturm*, p. 260–3.

6. T. pyxidiferum, *L.*=T. eximium *and* emarginatum, *Sturm*, p. 271–2; T. tranninense, *Fée*, p. 187, tab. 69. fig. 1.

7. T. RADICANS, *Sw.* = T. Luschnathianum *and* repens, *Sturm*, p. 263–4; T. frondosum, *Fée*, p. 190, tab. 68. fig. 1; T. lætevirens, *Fée*, p. 191, tab. 67. fig. 2.

8. T. CRISPUM, *L.* = T. pilosum, Sellowianum, cristatum, pellucens, Haenkeanum, Martiusii *and* eriophorum, *Sturm*, pp. 251–8.

9. T. LUCENS, *Sw.* = T. auratum, *Fée*, p. 186, tab. 67. fig. 1.

10. T. PINNATUM, *Sw.* = T. Vittaria, pinnatum, pennatum, Schomburgckianum, *and* Hostmannianum, *Sturm*, pp. 246–50.

11. T. TENERUM, *Spreng.* = T. fulvum, *Sturm*, p. 272, tab. 18. fig. 6.

12. T. RIGIDUM, *Sw.* = T. mandioccanum *and* firmulum, *Sturm*, p. 267.

13. T. GEMMATUM, *J. Smith* = T. cellulosum *and* filiforme, *Sturm*, p. 269.

Suborder III. CYATHEACEÆ.

CYATHEA.

1. C. VESTITA, *Mart.*, *Baker*, *Fl. Bras.* 49, p. 309. = C. vestita *and* hirtula, *Hook. & Baker*, *Syn. Fil.* p. 19; C. abruptecaudata, *Fée*, p. 183, tab. 62. fig. 2.

2. C. SCHANSCHIN, *Mart.* = C. acanthomelas, *Fée*, p. 177, tab. 64. fig. 1; C. sphærocarpa, *Fée*, *Fil. Bras.* p. 180, tab. 53. fig. 2; C. Feei, *Glaziou*, *Fée*, p. 179, tab. 66. fig. 2. (And I refer here Gardner, 2990, cited by Fée for *C. Serra*, Willd., which latter I have not seen from Brazil.)

3. C. GARDNERI, *Hook.* = C. mamillata, *Fée*, p. 176, tab. 63. fig. 2; C. Taunaysiana, *Fée*, p. 178, tab. 64. fig. 2; C. attenuata, *Fée*, p. 178, tab. 66. fig. 1.

HEMITELIA.

1. H. SETOSA, *Mett.* = Cyathea leucosticta, *Fée*, p. 182, tab. 65; Lophosoria dorsalis, *Fée*, p. 173, tab. 51. fig. 3.

2. H. MULTIFLORA, *R. Br.* = H. guianensis, *Hook. & Baker*, *Syn. Fil.* p. 30.

ALSOPHILA.

1. A. ARBUSCULA, *Presl.* = A. procera, *Hook. & Baker*, *Syn. Fil.* p. 33, *ex parte*; A. aperta, *Fée*, p. 158, tab. 54. fig. 2; A. Glaziovi, *Fée*, p. 160, tab. 55. fig. 2; A. Ceropteris, *Fée*, p. 163, tab. 57. fig. 1.

2. A. PROCERA, *Kaulf.* = A. dichromatolepis, *Fée*, p. 164, tab. 57. fig. 2.

3. A. LEUCOLEPIS, *Mart.* = A. pectinata, *Fée*, p. 168, tab. 60. fig. 1; A. glumacea, *Fée*, p. 170, tab. 61. fig. 2; A. nigrescens, *Fée*, p. 170, tab. 54. fig. 1.

4. A. PHALERATA, *Mart.* = A. infesta, *Hook. & Baker, Syn. Fil.* p. 34, *ex parte*; A. corcovadensis, *Fée*, p. 163, tab. 56. fig. 2.

5. A. PLAGIOPTERIS, *Mart.* = A. tijucensis, *Fée*, p. 173, tab. 73. fig. 1.

6. A. PALEOLATA, *Mart.* = A. scrobiculata, *Fée*, p. 157, tab. 53. fig. 1; A. eriocarpa, *Fée*, p. 162, tab. 66. fig. 1; A. Ludoviciana, *Fée*, p. 169, tab. 60. fig. 2; A. impressa, *Fée*, p. 165, tab. 58. fig. 1; A. Unguiscati, *Fée*, p. 165, tab. 58. fig. 2; A. contracta, *Fée*, p. 167, tab. 59. fig. 2.

7. A. VILLOSA, *Presl.* = A. leptocladia, *Fée*, p. 161, tab. 55. fig. 1.

8. A. ARMATA, *Presl.* = A. armata and hirta, *Hook. & Baker, Syn. Fil.* pp. 33, 35; A. rufa, *Fée*, p. 166, tab. 59. fig. 1.

9. A. PRUINATA, *Kaulf.* = Lophosoria pruinata, cæsia, prostrata, acaulis *and* affinis, *Fée*, pp. 172–4 (none figured).

Suborder IV. POLYPODIACEÆ.

DICKSONIA.

1. D. CICUTARIA, *Sw.* = Microlepia fluminensis, *Fée*, p. 151, tab. 51. fig. 1; Microlepia lindsayæformis, *Fée*, p. 152, tab. 51. fig. 2.

DAVALLIA.

1. D. BIFIDA, *Kaulf.* = Stenoloma Glaziovi, *Fée*, p. 153, tab. 52. fig. 1.

2. D. MEIFOLIA, *H., B., K.* = D. Sprucei, *Baker, Fil. Bras.* 49, p. 346; Lindsaya Sprucei, *Hook. & Baker, Syn. Fil.* p. 108; Stenoloma gratissima, *Fée*, p. 153, tab. 52. fig. 2.

LINDSAYA.

1. L. TRAPEZIFORMIS, *Dry.* = L. curvans *and* consanguinea, *Fée*, p. 30.

2. L. TENUIS, *Klotzsch.* = L. filiformis, *Hook. & Baker, Syn. Fil.* p. 106.

Adiantum.

1. A. lunulatum, *Burm.* = A. subaristatum, *Fée*, p. 33, tab. 8. fig. 3; A. flagellum, *Fée*, p. 33.

2. A. platyphyllum, *Sw.* = A. Kaulfussii, *Kunze, and* obliquum, *Willd., Hook. & Baker, Syn. Fil.* p. 115.

3. A. serrato-dentatum, *Willd.* = A. obtusum, *Desv., Hook. & Baker, Syn. Fil.* p. 119.

4. A. tetraphyllum, *Willd.* = A. Lancæa, *Baker, Fl. Bras.* 49, p. 373, *vix Linn.*, which is, as Dr. Kuhn has, since the publication of the 'Flora,' pointed out to me, most likely *Lindsaya trapeziformis*.

5. A. curvatum, *Kaulf.* = A. tetragonum, *Hook. & Baker, Syn. Fil.* p. 126, *non Schrad.*

Var. A. brasiliense (*Raddi*) = A. subramosum, *Fée*, p. 36, tab. 9. fig. 1.

6. A. cristatum, *L.* = A. tomentosum, *Fée*, p. 37, tab. 9. fig. 2.

7. A. Hewardia, *Kze.* = Hewardia diphylla, *Fée*, p. 39, tab. 9. fig. 3.

Hypolepis.

1. H. hostilis, *Presl.* = H. parviloba, *Fée*, p. 53, tab. 20. fig. 1.

Cheilanthes.

1. C. regularis, *Mett.* = Adiantopsis obtusissima, *Fée*, p. 52, tab. 13. fig. 1.

2. C. incisa, *Kunze.* = Hypolepis serrata, *Fée*, p. 53, tab. 13. fig. 3.

3. C. microphylla, *Sw.* = C. glaberrima, *Fée*, p. 54, tab. 13. fig. 2.

4. C. regnelliana, *Mett.* = C. flexuosa, *Hook. & Baker, Syn. Fil.* p. 138, *non Kunze.*

Pellæa.

1. P. microphylla, *Fée*, p. 43, tab. 4. fig. 2. = P. Glaziovii, *Baker, Fl. Bras.* fasc. 49, p. 595.

2. P. concolor, *Baker.* = P. geraniæfolia, *Fée, Hook. & Baker, Syn. Fil.* p. 146; Pteris concolor, *Langs. & Fisch. Icon. Fil.* (1810) p. 19, tab. 21.

3. P. flavescens, *Fée, Fil. Bras.* p. 44, tab. 22. fig. 2. = P. Bongardiana, *Baker, Fl. Bras.* fasc. 49, p. 397, tab. 55. fig. 2.

4. P. LONCHÓPHORA, *Baker.* = Heteropteris Dryopteris, *Fée*, p. 123, tab. 10. fig. 2.

PTERIS.

1. P. SUBSIMPLEX, *Baker.*=Pellæa subsimplex, *Fée*, p. 44, tab. 4. fig. 3; Pteris triphylla, *Baker, Fl. Bras.* fasc. 49. p. 596.

2. P. VISCOSA, *Moore.*=Cheilanthes glandulifera, *Fée*, p. 55; C. glandulosa, *Fée, Gen. Fil.* p. 158, *non Swartz.*

3. P. PALMATA, *Willd.* = Pellæa quinquelobata, *Fée*, p. 42, tab. 10. fig. 1.

4. P. SPLENDENS, *Kaulf.*=Litobrochia præalta, *Fée*, p. 46, tab. 11. fig. 2; L. organensis, *Fée*, p. 240 (not figured).

5. P. MACROPTERA, *Link.*=Litobrochia angustata, *Fée*, p. 49, tab. 11. fig. 1.

6. P. DECURRENS, *Presl.*= Litobrochia sericea, *Fée*, p. 48, tab. 11. fig. 3.

7. P. ACULEATA, *Sw.*=Litobrochia horizontalis, *Fée*, p. 48, tab. 12. fig. 1; L. varians, *Fée*, p. 49, tab. 12. fig. 2.

LOMARIA.

1. L. LANCEOLATA, *Spreng.*= L. lanceolata and L'Herminieri, *Hook. & Baker, Syn. Fil.* pp. 176-7.

2. L. PLUMIERI, *Desv.* = L. divergens, *Kunze, Hook. & Baker, Syn. Fil.* p. 176; L. mucronata, *Fée*, p. 20, tab. 8. fig. 3.

3. L. PENNA-MARINA, *Mett.*= L. alpina, *Spreng., Hook. & Baker, Syn. Fil.* p. 178.

4. L. CAPENSIS, *Willd.*= L. procera, *Spreng., Hook. & Baker, Syn. Fil.* p. 179.

5. L. TABULARIS, *Mett.*= L. Boryana, *Willd., Hook. & Baker, Syn. Fil.* p. 180; L. imperialis, *Fée & Glaz.* p. 21. tab. 7.

6. L. SEMICORDATA, *Baker.*= L. Fialhoi, *Fée & Glaz.* p. 239, tab. 7. fig. 2.

BLECHNUM.

1. B. LONGIFOLIUM, *H., B., K.*=B. diplotaxicum, *Fée*, p. 25, tab. 8. fig. 1.

2. B. OCCIDENTALE, *L.*=B. helvolum, *Fée*, p. 24.

Asplenium.

1. A. oligophyllum, *Kaulf.* = A. Escragnollei, *Fée*, p. 62, tab. 15.

2. A. lunulatum, *Sw.* = A. erectum, *Bory, Hook. & Baker, Syn. Fil.* p. 202; A. jucundum, *Fée*, p. 68, tab. 17. fig. 1.

3. A. abscissum, *Willd.* = A. firmum, *Kunze, Hook. & Baker, Syn. Fil.* p. 203.

4. A. anisophyllum, *Kunze.* = A. camptocarpum, *Fée*, p. 63, tab. 16. fig. 1; A. stenocarpon, *Fée*, p. 64, tab. 19. fig. 1.

5. A. Serra, *L. & F.* = A. incurvatum, *Fée*, p. 69, tab. 18. fig. 1.

6. A. pulchellum, *Raddi.* = A. Serronii, *Glaziou, Fée*, p. 68, tab. 17. fig. 2.

7. A. divergens, *Mett.* = A. scandicinum, *Hook. & Baker, Syn. Fil.* p. 445, *non Kaulf.*

8. A. scandicinum, *Kaulf.* = A. adiantoides, *Raddi, Hook. & Baker, Syn. Fil.* p. 217; A. chærophylloides, *Fée*, p. 71, tab. 16. fig. 2; A. Gastonis, *Fée*, p. 70, tab. 19. fig. 2.

9. A. pseudo-nitidum, *Raddi.* = A. ovalescens, *Fée*, p. 72, tab. 18. fig. 2.

10. A. Lechleri, *Mett.* = Diplazium parallelogrammum, *Fée*, p. 76, tab. 20. fig. 2.

11. A. Riedelianum, *Bongard.* = Diplazium dissimile, *Fée*, p. 76, tab. 21. fig. 1.

12. A. celtidifolium, *Kunze.* = Diplazium longipes, *Fée*, p. 77, tab. 21. fig. 2.

13. A. radicans, *Schk.* = Diplazium leptochlamys, *Fée*, p. 79, tab. 22. fig. 1; D. leptocarpon, *Fée*, p. 80, tab. 23. fig. 2; D. rostratum, *Fée*, p. 81, tab. 24. fig. 2; D. remotum, *Fée*, p. 81, tab. 24. fig. 1; Gymnogramma expansa, *Fée*, p. 69, tab. 14. fig. 4?

14. A. herbaceum, *Baker.* = Diplazium herbaceum, *Fée*, p. 80, tab. 23. fig. 1; A. Glaziovii, *Baker, Fl. Bras.* fasc. 49. p. 455.

A. monanthemum, L., and *castaneum*, C. & S., have been lately discovered in the neighbourhood of Rio by Dr. Glaziou.

Scolopendrium.

1. S. plantagineum, *Schrad.* = Antigramme Lageana, *Fée & Glaz.* p. 264.

Aspidium.

1. A. aculeatum, *Sw.* (including *Polypodium platyphyllum* and *rigidum,* Hook. and Baker, Syn. Fil. p. 310) = Polystichum microsorium, *Fée,* p. 125, tab. 40. fig. 1; P. lanosum, *Fée,* p. 126, tab. 40. fig. 2; P. tijucense, *Fée,* p. 127, tab. 38. fig. 1; P. giganteum, *Fée,* p. 127, tab. 39. fig. 2; P. aculeolatum, *Fée,* p. 128, t. 38. fig. 2; P. platylepis, *Fée,* p. 129, tab. 41. fig. 1; P. longecuspis, *Fée,* p. 129, tab. 41. fig. 2.

2. A. capense, *Willd.* = Polystichum remotum, *Fée,* p. 125, tab. 39. fig. 1.

Nephrodium.

1. N. Sancti-Gabrieli, *Baker.* = Polypodium Sancti-Gabrieli, *Hook. & Baker, Syn. Fil.* p. 304.

2. N. patens, *Desv.* = Aspidium nephrodioides, *Fée,* p. 138, tab. 46. fig. 1, *non Hook. nec Klotzsch*; A. quadrangulare, *Fée,* p. 145, tab. 50. fig. 2.

3. N. eriocaulon, *Baker.* = Aspidium eriocaulon, *Fée,* p. 136, tab. 44. fig. 1; Nephrodium ramentaceum, *Baker, Fl. Bras.* fasc. 49, p. 473.

4. N. vestitum, *Baker.* = Aspidium basilare, *Fée,* p. 135, tab. 43. fig. 2; Phegopteris fluminensis, *Fée,* p. 97 (not figured).

5. N. caripense, *Hook.* = Aspidium nervatum, *Fée,* p. 136; A. amaurolepis, *Fée,* p. 137, tab. 44. fig. 2; A. isabellinum, *Fée,* p. 137, tab. 45. fig. 2?; Phegopteris Oreopteridastrum, *Fée,* p. 97.

6. N. conterminum, *Desv.* = Aspidium helvolum, *Fée,* p. 132, tab. 42. fig. 2; A. elatior, *Fée,* p. 132, tab. 42. fig. 3; A. Berteroanum, *Fée,* p. 133; A. sericeum, *Fée,* p. 144, tab. 42. fig. 1; A. rivularioides, *Fée,* p. 145, tab. 50. fig. 1.

7. N. Sprengelii, *Hook.* = A. tenerrimum, *Fée,* p. 134, tab. 43. fig. 1.

8. N. patulum, *Baker.* = Aspidium patulum, *Swartz, Vet. Acad. Handl.* 1817, p. 74; N. mexicanum, *Hook. & Baker, Syn. Fil.* p. 276.

9. N. protensum, *Baker.* = Aspidium protensum, *Swartz, Schrad. Journ.* 1800, vol. ii. p. 36; A. dicksonioides, *Fée,* p. 143, tab. 49. fig. 1.

10. N. flexuosum, *Baker, Fl. Bras.* fasc. 49, p. 483. = Aspidium flexuosum, *Fée,* p. 138, tab. 47. fig. 2. (Here by chance we have both independently hit upon the same specific name.)

11. N. villosum, *Presl.* = Aspidium crenulans, *Fée,* p. 139, tab. 47.

fig. 1; Phegopteris mollivillosa, *Fée*, p. 101; P. brevinervis, *Fée*, p. 105; P. marginans, *Fée*, p. 104, tab. 61. fig. 1.

12. N. DENTICULATUM, *Hook.*=Aspidium gracilipes, *Fée*, p. 146, tab. 49. fig. 2; A. tenerum, *Fée*, p. 147.

13. N. AMPLISSIMUM, *Hook.*=Aspidium biforme, *Fée*, p. 139; A. phæochlamys, *Fée*, p. 140, tab. 47. fig. 2; A. ramosum, *Fée*, p. 141, tab. 47. fig. 3; A. macrum, *Fée*, p. 142, tab. 48. fig. 1; A. latissimum, *Fée*, p. 142, tab. 48. fig. 2.

14. N. MACROPHYLLUM, *Baker.*=Cardiochlæna pilosa, *Fée*, *Mém.* 10, p. 45, tab. 40. fig. 4.

POLYPODIUM.

1. P. ROTUNDATUM, *Willd.*=P. flavopunctatum, *Kaulf.*, *Hook. & Baker, Syn. Fil.* p. 304; Phegopteris tenuis, *Fée*, p. 99, tab. 30. fig. 1.

2. P. TIJUCCANUM, *Raddi.*=Phegopteris tricholepis, *Fée*, p. 98, tab. 38. fig. 2; P. heterocarpa, *Fée*, p. 100, tab. 30. fig. 2; P. brevinervis, *Fée*, p. 243, tab. 77. fig. 2; Polypodium refulgens, *Klotzsch*, *Hook. & Baker, Syn. Fil.* 307.

3. P. PTEROIDEUM, *Klotzsch.*=Gymnogramma patula, *Fée*, p. 59, tab. 14. fig. 3.

4. P. MACROPTERUM, *Kaulf.*=P. connexum *and* splendidum, *Hook. & Baker, Syn. Fil.* p. 312; P. Fischerianum, *Baker, Syn. Fil.* p. 455; Phegopteris scrobiculata, *Fée*, p. 102, tab. 31. fig. 2; P. eriopodia, *Fée*, p. 102, tab. 31. fig. 3; P. adnata, *Fée*, p. 103; P. propinqua, *Fée*, p. 103.

5. P. ANDROGYNUM, *Poir.*=P. tetragonum, *Swartz*, *Hook. & Baker, Syn. Fil.* p. 317; Goniopteris macrocladia, *Fée*, p. 106, tab. 33. fig. 3; G. platypes, *Fée*, p. 106, tab. 33. fig. 1; G. hastata, *Fée*, p. 107, tab. 33. fig. 2.

6. P. MARGINELLUM, *Sw.*=Grammitis fluminensis, *Fée*, p. 83, tab. 19. fig. 3.

7. P. TOVARENSE, *Klotzsch.*=P. subdimidiatum, *Baker, Syn. Fil.* p. 324.

8. P. ORGANENSE, *Mett.*=Grammitis organensis, *Fée*, p. 264, tab. 78. fig. 1.

9. P. JUBÆFORME, *Kaulf.*=P. immersum, *Fée*, p. 88, tab. 27. fig. 1.

10. P. CULTRATUM, *Willd.* (including *P. reclinatum*, Brack., Hook. & Baker, Syn. Fil. p. 335).=P. ciliare, *Fée*, p. 94, tab. 27. fig. 2; P.

ovalescens, *Fée*, p. 94, tab. 27. fig. 3; P. semiadnatum, *Fée*, p. 95, *non Hook.*

11. P. CAPILLARE, *Desv.*=P. decipiens, *Hook. & Baker, Syn. Fil.* p. 329; P. blandum, *Fée, Mém.* 7, p. 59, tab. 22. fig. 5.

12. P. PENDULUM, *Sw.*, includes *P. subsessile*, Hook. & Baker, Syn. Fil. p. 329.

13. P. HIRSUTULUM, *Fée, Fil. Bras.* p. 87, tab. 26. fig. 2, *non Raddi.* =P. gradatum, *Baker, Fl. Bras.* fasc. 49, p. 513.

14. P. TENUICULUM, *Fée.*=P. brevistipes, *Mett.*; *Baker, Fl. Bras.* fasc. 49, p. 598.

15. P. SUSPENSUM, *L.*=P. repandum, *Fée*, p. 87, tab. 29. fig. 1.

16. P. CHNOOPHORUM, *Kze.*, includes *P. sublanosum*, Hook. & Baker, Syn. Fil. p. 330.

17. P. ELASTICUM, *Rich.*=P. taxifolium, *Hook. & Baker, Syn. Fil.* p. 332, *ex parte.* (*P. Schkuhrii*, Raddi, belongs here, not to *pectinatum*, under which it is cited in 'Synopsis Filicum.')

18. P. TAXIFOLIUM, *L.*=P. gratum, *Fée*, p. 242, tab. 76. fig. 2.

19. P. APICULATUM, *Kunze.*=P. confluens, *Fée*, p. 89, tab. 26. fig. 3.

20. P. RECURVATUM, *Kaulf.*=P. extensum, *Fée*, p. 85, tab. 28. fig. 3; P. Paradisiastrum, *Fée*, p. 90, tab. 29. fig. 2.

21. P. PECTINATUM, *L.*= P. robustum, *Fée*, p. 92, tab. 28. fig. 1.

22. P. OTITES, *L.*=P. tenuifolium, *H., B., K.*; *Hook. & Baker, Syn. Fil.* p. 334.

23. P. PLEBEIUM, *Schlecht.*= P. Pleopeltidis, *Fée*, p. 86, tab. 26. fig. 1.

24. P. VACCINIIFOLIUM, *L. & F.*=Craspedaria cordifolia, *Fée*, p. 118, tab. 36. fig. 1; C. crispata, *Fée*, p. 119, tab. 36. fig. 2.

25. P. CATHARINÆ, *L. & F.*=Chrysopteris Raddiana, *Fée*, p. 120 (not figured).

26. P. LORICEUM, *L.*=Goniophlebium pectinans, *Fée*, p. 109, tab. 34. fig. 1; G. grammatoides, *Fée*, p. 110, tab. 34. fig. 2; G. pictum, *Fée*, p. 244, tab. 77. fig. 3.

27. P. BRASILIENSE, *Poir.*=P. neriifolium, *Schk., and* P. menisciifolium, *L. & F., Hook. & Baker, Syn. Fil.* pp. 345–6; Goniophlebium excelsior, *Fée*, p. 244, tab. 77. fig. 4; G. Gauthieri, *Fée*, p. 112, tab. 34. fig. 3.

28. P. ANGUSTIFOLIUM, *Sw.* = Campyloneuron leuconeuron, *Fée*, p. 113, tab. 35. fig. 1.

29. P. LÆVIGATUM, *Car.* = P. lapathifolium, *Lam., Hook. & Baker, Syn. Fil.* p. 348; Campyloneuron fallax, *Fée*, p. 114, tab. 35. fig. 2; C. acrocarpon, *Fée*, p. 115, tab. 35. fig. 3.

30. P. DECURRENS, *Raddi.* = Campyloneuron juglandifolium, *Fée*, p. 117, tab. 45. fig. 1.

31. P. LYCOPODIOIDES, *L.* (including *P. stigmaticum*, Presl., Hook. & Baker, Syn. Fil. p. 357). = Craspedaria grandis, *Fée*, p. 119, tab. 37. fig. 2; Drynaria acuminata, *Fée, Fil. Bras.* p. 122, tab. 37. fig. 3.

32. P. ANGUSTUM, *Mett.* = Drynaria Raddiana, *Fée*, p. 122.

JAMESONIA.

1. J. CANESCENS, *Kze.*, hitherto known only in the Andes, has lately been discovered near Rio by Dr. Glaziou.

GYMNOGRAMME.

1. G. DIPLAZIOIDES, *Desv.* = G. oppositans, *Fée*, p. 58, tab. 14. fig. 1.

2. G. GRANDIS, *Baker.* = G. attenuata, *Fée*, p. 59, tab. 14. fig. 2.

3. G. SCANDENS, *Baker.* = Neurogramme scandens, *Fée*, p. 263. Seems a well-marked new species, near *flabellata*, not included in 'Flora Brasiliensis.'

4. G. CHÆROPHYLLA, *Desv.* = Anogramme villosa, *Fée*, p. 60.

5. G. BIARDII, *Baker.* = Anogramme Biardii, *Fée*, p. 241, tab. 77. fig. 1; G. extensa, *Baker, Fl. Bras.* fasc. 49, p. 599.

MENISCIUM.

1. M. RETICULATUM, *Sw.* = M. elongatum, *Fée*, p. 83, tab. 25. fig. 1; M. longifolium, *Fée*, p. 84, tab. 25. fig. 2; M. sessiliflorum, *Pohl, Fée, Fil. Bras.* p. 84.

TÆNITIS.

T. ANGUSTIFOLIA, LANCEOLATA, et FURCATA, *Hook. & Baker, Syn. Fil.* p. 396–7, are transferred to VITTARIA in 'Flora Brasiliensis.'

ACROSTICHUM.

1. A. CONFORME, *Sw.* = A. spissum, *Fée*, p. 8, tab. 2. fig. 2; A. obliquatum, *Fée*, p. 261 (not figured).

2. A. LINGUA, *Raddi.*=A. ovalifolium, *Fée*, p. 3, tab. 4. fig. 1.

3. A. LATIFOLIUM, *Sw.*=A. hymenodiastrum, *Fée*, p. 3, tab. 5; A. papyraceum, p. 4, tab. 3. fig. 1; A. amplissimum, *Fée*, p. 5, tab. 6.

4. A. SQUAMIPES, *Hook.*=A. craspedariæforme, *Fée*, p. 261 (not figured).

5. A. AUBERTII, *Desv.* (including *lineare*, Fée).=A. stramineum, *Fée*, p. 238, *non Mett.*; A. mollissimum, *Fée*, p. 7, tab. 2. fig. 3; A. hirtipes, *Fée*, p. 238, tab. 76. fig. 1.

6. A. VISCOSUM, *Sw.*=A. prælongum, *Fée*, p. 9, tab. 1. fig. 2.

7. A. SCOLOPENDRIFOLIUM, *Raddi.*=A. Glaziovii, *Fée*, p. 6, tab. 1. fig. 1.

8. A. AURICOMUM, *Kunze.*=A. chrysolepis, *Fée*, p. 10, tab. 2. fig. 2; A. acuminans, *Fée*, p. 12, tab. 1. fig. 2,

9. A. CAUDATUM, *Hook.*=Polybotrya semipinnata, *Fée*, p. 16.

10. A. OSMUNDACEUM, *Hook.*=Polybotrya frondosa, *Fée*, p. 15.

11. A. GUIANENSE, *Baker* (Polypodium, *Aublet*).=A. Raddianum, *Kunze, Hook. & Baker, Syn. Fil.* p. 423.

Suborder V. OSMUNDACEÆ.

OSMUNDA.

1. O. CLYTONIANA, *L.*=O. pilosa, *Sturm*, p. 164.

2. O. CINNAMOMEA, *L.*=O. imbricata, *Sturm*, p. 164.

3. O. REGALIS, *L.*=O. gracilis *et* palustris, *Sturm*, pp. 164–6.

Suborder VI. SCHIZÆACEÆ.

SCHIZÆA.

1. S. DICHOTOMA, *Sw.*=S. Poppigiana, *Sturm*, p. 181.

2. S. ELEGANS, *Sw.*=S. spectabilis (tab. 14), pacificans, flabellum, *et* attenuata, *Sturm*, pp. 182–4.

3. S. PENNULA, *Sw.*=S. subtrijuga, *Sturm*, p. 179.

ANEMIA.

1. A. GARDNERI, *Hook.*=A. Glaziovii, *Fée*, p. 207, tab. 74. fig. 2.

2. A. FILIFORMIS, *Presl.*=A. microstachys, *Fée,* p. 206, tab. 74. fig. 3.

3. A. OBLONGIFOLIA, *Sw.*=A. lanuginosa, pilosa, humilis, *et* Schomburgckiana, *Sturm,* pp. 210–14.

4. A. COLLINA, *Raddi.*=A. vellea, *Sturm,* p. 199.

5. A. BREUTELIANA, *Presl.*=A. incisa, Pohliana, hirta, *et* pallida, *Sturm,* pp. 194–8.

6. A. TOMENTOSA, *Sw.*=A. anthriscifolia, fulva, rubrostipes, ferruginea, tomentosa, villosa, *et* oblonga, *Sturm,* pp. 200–206.

7. A. HIRSUTA, *Sw.*= A. ciliata, dissecta, *et* tenera, *Sturm,* p. 207; A. gracilis, *Sturm,* p. 217?

8. A. PHYLLITIDIS, *Sw.*=A. obliqua, fraxinifolia, macrophylla, sorbifolia, longifolia, densa, laciniata, *et* nervosa? *Sturm,* pp. 187–193.

9. A. ASPERA, *Baker.* = Anemiæbotrys aspera, *Fée,* p. 267, tab. 78. fig. 2. A very curious plant, with the general habit of a large form of *A. tomentosa,* but with the fertile divisions parallel with the sterile pinnæ, spreading horizontally in a similar manner, inserted in the primary rachis at a considerable distance below. It was gathered also in 1868 near Rio by Lieut. Carr.

LYGODIUM.

1. L. VENUSTUM, *Sw.*=L. Pohlianum, *Sturm,* p. 172; L. palmatilobum *et* mucronatum, *Sturm,* pp. 170, 171?

2. L. VOLUBILE, *Sw.*=L. expansum (tab. 13), lucens, acuminatum, hirtum, puberulum, hastatum, *et* micans, *Sturm,* pp. 173–8.

Suborder VII. MARATTIACEÆ.

MARATTIA.

1. M. CICUTÆFOLIA, *Kaulf.*=M. Raddiana, polyodon, obtusidens, *et* Verschaffeltiana (tab. 10), *Sturm,* pp. 150–153.

Suborder VIII. OPHIOGLOSSACEÆ.

OPHIOGLOSSUM.

1. O. NUDICAULE, *L. fil.*=O. Spruceanum, *Fée,* p. 218, tab. 52. fig. 3.

Note on *Nemacladus*, Nutt. By Asa Gray.

[Read January 16, 1873.]

When in California last summer, I collected Nuttall's *Nemacladus*, which abounds in the Yo-semite valley and vicinity; and I have just studied it with the view of making out its affinities. It is quite unlike any other American plant I know; and it is not surprising that Nuttall should have regarded it as the type of a distinct family, between *Lobeliaceæ* and *Gordonieæ*. I have not his description and remarks before me, but have drawn up the following character from the specimens. Dr. Torrey has given a tolerable figure in the 'Botany of the Mexican Boundary,' but no description. He suggests that it should be referred to the order *Lobeliaceæ*, notwithstanding the free anthers. I agree to this, provided that it also contain *Cyphia*; for it appears to me that *Nemacladus* is clearly related to that South-African genus. Thus the *Cyphieæ* would be a tribe of *Lobeliaceæ*, with distinct anthers and sometimes distinct filaments also, and the flower, as in *Parastranthus*, not resupinate by a twist, therefore preserving the normal character of the corolla $\frac{3}{2}$. As to the indusiate ring, the absence of which in *Nemacladus* is remarked upon by Dr. Torrey, I find an evident vestige of it in that; and Sonder notices it in *Cyphia*. One could wish that in the 'Genera Plantarum' the *Lobeliaceæ*, including De Candolle's *Cyphiaceæ*, might be kept distinct from *Campanulaceæ*, which seems a better alternative than to take in the *Gordonieæ* also, as is done in the 'Flora Capensis.' I believe *Nemacladus* is not lactescent.

The following are its leading characters:—

Nemacladus, *Nutt. in Trans. Amer. Phil. Soc.* n. ser. viii. p. 524; *Torr. Bot. Mex. Bound.* p. 108, t. 35.

Calyx tubo turbinato cum ovario connato, lobis 5 subinæqualibus. *Corolla* bilobiato-5-partita, $\frac{3}{2}$, nempe labio superiore 3-partito, inferiore paullo longiore alte bipartito vel e petalis discretis, segmentis omnibus angusto-oblongis. *Stamina* 5 cum corolla inserta, glaberrima; filamenta a medio fere ad apicem monadelpha; antheræ ovales, introrsæ, nudæ, biloculares, loculis longitudinaliter dehiscentibus. *Pollen* globosum. *Ovarium* fere semisuperum, biloculare, pluriovulatum. *Ovula* placentæ axili inserta, horizontalia, anatropa. *Stylus* filiformis, apice

inter stamina incurvus: stigma capitatum, bilobum: annulus sub stigmate obsoletus, imberbis. *Capsula* ovoideo-oblonga, $\frac{2}{3}$ supera, loculicida, valvis medio septiferis et placentiferis. *Semina* ovalia, testa tenui nucleo conformi. *Embryo* cylindraceus in albumine copioso carnoso.

N. RAMOSISSIMUS, *Nutt. l. c.* **Herba exilis, Novo-Mexicano-Californica, parvifolia; radice annua; foliis radicalibus ovalibus subdentatis, caulinis bracteisve subulatis; ramis flexuosis racemoso-multifloris pedicellisque filiformibus seu capillaribus patentissimis; floribus pusillis, carneis.**

It is worth noticing that the only true Lobeliaceous genus of the Pacific coast of North America is of a distinct tribe, of which the other representative, *Grammatotheca*, is likewise South-African. As Douglase's generic name gives way to Rafinesque's *Clintonia* in Liliaceæ, and is replaced by Torrey's name *Donningia* ('Pacif. R. R. Exped.' iv. p. 116), the name of De Candolle's tribe *Clintonieæ* had best be replaced by that of *Grammatotheceæ*.

Enumeration of the Fungi of Ceylon. By the Rev. M. J. BERKELEY, F.L.S., and C. E. BROOME, Esq., F.L.S. Part II., containing the remainder of the Hymenomycetes, with the remaining established tribes of Fungi.

(Read April 3, 1873.)

THE Fungology of Ceylon on a revision of the species, as far as they have come into our hands, amounting to 1190, is exactly such as might be suspected from the climatic conditions of the country. The heat is not so great as might be anticipated from the geographical position, being moderated by sea-breezes, and, at least in the districts whence the specimens have been derived, is much less than that of the neighbouring parts of the Indian peninsula. At Columbo the annual range of temperature is from 76°–80°·3, at Galle from 70°–87°, at Jaffnapatam from 70°–90°, at Trincomalee from 74°·3–91°·3, at Kandy, 1457 feet above the sea, from 66°–86°, at Nuwara Eliya 35°·3–80°·3. While the eastern part of the island is hot and dry, the west is moist and favourable to the growth of Fungi. The rainfall at Kandy is 85·3 inches, at Columbo 75–80.

A large proportion of the species received come from Pera-

deniya and Nuwara Eliya, where the temperature neither descends so low as to destroy mycelia from excessive cold, nor rises so high as to make the growth of European forms impossible. Accordingly we have multitudes of species of Agarics which differ little from European forms, though they are seldom identical, mixed, however, with a few, especially in the subgenera *Psalliota* and *Lepiota*, which may be characterized as subtropical forms, such as *Agaricus cepæstipes*, *licmadophorus*, and others which occur in our hothouses and are probably imported species. The same may be said also of certain species in other divisions, which occur under similar conditions in other parts of the world, such as *Angelina Leprieurii*.

In the tropical forests the number of species diminishes considerably, and we meet with such common forms as *Polyporus xanthopus*, *P. cinnabarinus*, *Guepiniæ*, &c., with an admixture of new forms. Many of the species are identical with those from the Neilgherries. The new genera are few in number, the most interesting being *Rachophyllum* amongst the *Agaricini*, *Husseia* amongst the *Trichogastres*, *Astrocystis* amongst the *Sphæriacei*, with one or two Mucedinous genera, which may prove to be mere conidiiferous forms of *Sphæriacei* when more accurately examined. It is probable that some interesting Hypogæous fungi will reward future researches, as is indicated by the genera *Tuber* and *Paurocotylis* affording one or more species. Amongst the Epiphyllous Fungi the genus *Ravenelia* is conspicuous, reproducing the American and Indian forms, with one or two at present confined to the island. The parasite which has proved such a pest to the Coffee plantations, *Hemileia vastatrix*, is singular amongst *Uredinei*, as partaking somewhat of the character of *Rhinotrichum* amongst the *Mucedines*. In addition to the above remarks, for which we are greatly indebted to standard geographical works, the following interesting letter from Mr. Thwaites is appended, dated Peradeniya, Sept. 27, 1872.

"It might be supposed by any one arriving here in the middle of our dry weather, that this must be the most unfavourable place for the growth of such moisture-loving plants as Fungi; but let him wait till the humid atmosphere and October rains have set in, and he will be not a little surprised at the rapidity with which cryptogamic plants of many kinds, not only Fungi but Mosses, Lichens, and Hepaticæ, begin to make their appearance, just as in England during the same month of October. Clusters of

Agarics appear on the ground where there happens to be any thing organic going to decay. The grass (for we have fine park-like breadths of grass here) is spotted with the beautiful *Agaricus dolichaulos* and with other species; the sense of smell is often offended by the unpleasant odour of Phalloids; and there is in every forest or shrubby spot the same peculiar smell that one is sensible of in similar places in England, arising from the various kinds of Fungi growing amongst the decaying fallen sticks and leaves.

"From scarcely above the sea-level to an elevation of five or six thousand feet, but little difference is observable in the fungous vegetation, the surface of the soil in the depths of the forests at these respective elevations not possessing so great a difference of temperature as to cause much diversity in the Fungi which affect them. There are of course some few species which are not found within so wide a zone of altitude, but apparently very few. The above remarks refer to the humid central and southern districts: I have not had much opportunity of collecting Fungi in the very much drier northern parts of the island during their short wet season; but I should be disposed to believe that, with the excep- of the Epiphyllous kinds, and of the corky *Polypori* &c., the species would be found to be far less numerous than in the moister climate of the south. Upon no occasion have I remained long enough in our highest hills to make a very careful collection of the species of Fungi to be found upon them. So far as I observed, Fungi appeared to me less abundant generally than in the warmer more sheltered parts of the island. At an elevation of more than 7000 feet, I found a single specimen of a new species of *Phallus* of a deep red colour, which has not occurred to me elsewhere. *Aseroë actiniformis* is usually met with at an elevation of about 5000 feet, and it is sometimes rather common upon the ground under coffee-trees. *Husseia* I have always met with on the sandy margins of forest-streams."

It is curious that, though the genus *Agaricus* is so prolific in species, not a single *Cortinarius* has occurred, while *Lactarius* is also absent, *Russula* being represented by a single species. *Marasmii* and *Lentini* are, as might be expected, abundant. *Boletus* presents a single species only. The *Myxogastres* are mostly European species, which agrees with what has been observed in other tropical or subtropical countries.

The following is a rough estimate of the species according to

their distribution, as regards those which are European, those which occur in the West-Indian Isles and the southern United-States provinces, those which are widely diffused, and those which have hitherto been detected in Ceylon only. The species enumerated are 1190; of these rather more than one sixth (191) are European species, rather more than one twenty-fourth (49) are species of the West Indies and Southern United States, more than a tenth (122) are widely dispersed species, while more than two thirds (820) are peculiar to Ceylon. The number of cosmopolitan species does not amount to 10. The genus *Agaricus* alone comprises rather more than one third, *Marasmius* one twenty-seventh, and *Polyporus* one sixteenth.

342. AGARICUS (CREPIDOTUS) REVERSUS, *B. & Br.* Minimus, primum convexus; pileo cum stipite brevi, demum reflexo, albo-pruinato; lamellis cinnamomeis (no. 394).

On decayed wood.

Spores ·00025 long *.

343. A. (CREPIDOTUS) PEZIZULA, *B. & Br.* Pusillus pezizæformis pallidus pulverulentus; lamellis tabacinis (no. 395).

On dead herbaceous stems.

It appears to be pezizæform from the first, and not reflexed as in the last.

Spores ·0004 long.

344. A. (PSALLIOTA) PEDILIUS, *B. & Br.* Pileo ovato compacto e volva stellata ejusque apicem obtegente oriundo, furfuraceo; stipite cavo farcto sursum attenuato; lamellis angustis albis (no. 1221, cum ic.).

Pileus ovate, capped with the dark remains of the volva, beneath which it is furfuraceous, fleshy, slightly appendiculate, 1¼ inch high, 1½ wide at the base; stem 2¼ inches high, 1 inch thick in the middle, obtuse below, attenuated above, with a broad stellate volva at the base, and with a narrow cavity in the centre which is stuffed with white flocci; flesh, like that of the pileus, turning red; gills narrow, free, white.

345. A. (PSALLIOTA) PODERES, *B. & Br.* Pileo hemisphærico fibrilloso-squamoso sericeo-striato, apice volvæ fragmentis aspero; stipite sursum attenuato; annulo supero amplissimo; volvæ brunneæ margine dentato (no. 1220, cum icone).

Pileus 2 inches wide, stem 1¾ high, ¾ thick.

Undoubtedly closely allied to the last, but differs in the hemispherical squamulose striate pileus, less ample volva, and above all in the presence of a large white ring.

* The decimal numbers are parts of an English inch.

346. **Cantharellus elegans**, *B. & Br.* Fascicularis; pileo convexo umbrino, sursum decolorante, striato pellucido; stipite striato, primum pulverulento; venis angustissimis, interstitiis subtiliter hispidulis (no. 809).—Marasmius congregatus, *Mont.*

Sep.–Dec. 1868.

Pileus about ½ an inch across, hygrophanous; stem 1–2 inches high. Veins extremely narrow, interstices nearly even, minutely hispid. Mycelium ample, fibrous, branched.

347. C. **inæqualis**, *B. & Br.* Pileo infundibuliformi aurantiaco pulverulento; stipite elongato, sursum dilatato; venis sublamelliformibus obtusis decurrentibus, interstitiis lævibus (no. 103 in part).

Peradeniya, 1868.

Subcæspitose; pileus ⅓ inch across, deeply infundibuliform, sometimes splitting, pulverulent or subtomentose; stem nearly 1 inch high, about ½ a line thick, dilated upwards, furfuraceous or fibrillose; veins much broader than in *C. humilis*, but truly those of a *Cantharellus*; interstices even.

348. C. **humilis**, *B. & Br.* Cæspitosus, ex ochraceo brunneolus; pileo infundibuliformi subtiliter pubescente, margine reflexo; stipite brevi, sursum dilatato, pulverulento, e mycelio membranaceo oriundo; venis angustissimis furcatis, interstitiis venoso-reticulatis (no. 91 in part).

Peradeniya, July, August 1868. On sticks &c.

Pileus ¾–1½ inch broad, whole plant with stem about ¾ inch high. Occasionally the pileus splits on one side so as to become flabelliform; sometimes it splits in several directions.

Its nearest ally is apparently *C. aurantiacus*.

349. C. **rabidus**, *B. & Br.* Pileo umbilicato, helvolo, sicco, rufo, stipite sursum dilatato; venis decurrentibus arcuatis, interstitiis venosis.

On dead wood. Peradeniya, Dec. 1868.

Pileus about ¼ inch across, "dull yellow, becoming altogether red in drying;" stem scarcely ½ an inch high, not half a line thick; veins obtuse. Pileus darker at first than the rest of the plant.

350. C. **capensis**, *B. Hook. Lond. Journ.* 1844, p. 187. (Nos. 90, 684.)

Peradeniya, Nov. 1867; south of the island, July 1868.

351. **Marasmius nummularius**, *B. & Br.* Fulvus; pileo convexo umbonato subtiliter pulverulento; stipite e strato membranaceo fulvo oriundo, hispidulo, cavo; lamellis citrinis postice rotundatis liberis (no. 102, cum icone).

On dead leaves &c. Peradeniya, Dec. 1864, 1868, Jan. 1869.

Pileus not ½ an inch across, slightly convex, umbonate; flesh thin, white;

stem $1\frac{1}{4}$ inch high, pale above, minutely hispid, at length hollow; gills ventricose, lemon-coloured, rounded behind, free.

Allied to *M. confertus*, and resembling it closely in the peculiar mycelium.

352. M. CONFERTUS, *B. & Br.* Congregatus; pileo e subcampanulato plano depressove, submembranaceo, fulvo-fusco, lævi; stipitibus concoloribus cavis politis e basi communi membranacea pilosa oriundis; lamellis concoloribus ventricosis liberis (no. 1190).

Amongst dead vegetable substances. July 9, 1869.

Crowded; pileus $\frac{3}{4}$ inch across, at first campanulate, then plane or depressed, tawny brown, even, thin; stem 1–2 inches high, $\frac{3}{4}$ line thick, paler above, springing from a common mycelium, which is membranaceous, with branched creeping threads; gills of the same colour, slightly ventricose, free, about a line wide.

Spores subglobose, ·00025 in diameter.

353. M. WYNNEI, *B. & Br. Outl.* p. 220.

Var. *auroricolor*. Roseus, siccus purpurascens, cæspitosus; pileo campanulato, demum depresso undulato, tenui; stipite deorsum attenuato glabro fistuloso; lamellis latis acute adnatis (no. 765, cum icone).

Amongst decayed vegetable matter. Peradeniya, Dec. 1868, Jan. 1869.

Cæspitose, whole plant of a pale rose-colour changing to livid purple when dry.

Pileus $1\text{–}1\frac{1}{2}$ inch across; stem 3 inches high, 2 lines thick, smooth; gills nearly 2 lines broad; interstices venose. Whole plant of a dull reddish purple in specimens gathered Sep. 1868. No. 204 is the same thing, the specimens varying from dull reddish purple to fuscous.

354. M. CALVUS, *B. & Br.* Pileo e campanulato plano margine umbrino sulcato picto, centro pallido calvo; stipite albido fistuloso; lamellis liberis pallidis (no 766, cum icone).

On dead sticks. Jan. 1867, Sep.–Nov. 1868.

Pileus $\frac{3}{4}\text{–}1\frac{1}{2}$ inch across, pale and even in the centre, sulcate towards the margin, umber, elegantly varied with radiating lines; stems $1\frac{1}{4}\text{–}2$ inches high, $\frac{3}{4}$–1 line thick, fistulose; gills pallid, sometimes arcuate and narrow, sometimes ventricose as in the more beautifully painted specimens; interstices even; spores white. Mycelium floccoso-fibrous.

355. M. OCHRACEUS, *B. & Br.* Pileo convexo obtuso subcarnoso lævi glabro subfulvo; stipite subæquali cavo, deorsum pubescente concolori; lamellis latis ventricosis affixis pallidis (no. 795, cum icone).

On rotten wood. Peradeniya, Oct., Nov. 1868.

Pileus 2½–3 inches across, convex, smooth, bright tawny, even, flesh moderately thick, white, mottled with reddish brown; stem 4 inches or more high, 2 lines thick, nearly equal, smooth, except towards the tomentose base, hollow, of the same colour; gills 3–4 lines broad, ventricose, rounded behind, pallid, affixed. In drying it acquires a deep umber tint.

356. M. HYPOCHROIDES, *B. & Br.* Pileo e campanulato subplano rugoso sulcato castaneo; stipite flexuoso glabro cavo basi subincrassato; lamellis ventricosis undulatis ochraceis subliberis (no. 101, cum icone).

On various decaying substances. Peradeniya, Sep. 1868.

Pileus 1½ inch across, slightly umbonate, chestnut-brown, deeply sulcate, very thin; stem 3 inches high, 1 line thick, smooth, fistulose, of a fibrous structure; gills ochraceous, undulated, ventricose, distant, 2 lines broad, interstices veiny. In the flatter specimens the gills are not so ventricose.

357. M. CRISPATUS, *B. & Br.* Pileo e campanulato convexo-plano obtuso subcarnoso sulcato-striato rufo-fusco, centro saturatiore; stipitibus fasciculatis e strato piloso oriundis farctis pallidis apice dilatatis; lamellis pallidioribus arcuatis breviter adnatis (no. 38 in part).

On dead leaves. Peradeniya, Nov. 1867, June 1868.

Pileus 2½–3 inches across, sulcato-striate, crenate, chestnut-brown, somewhat radiated, dark in the centre; stem 3 inches (or more) high, 2 lines thick, pallid above, stuffed; gills arcuate, shortly adnate.

This species varies much; some of the dried specimens are umbilicate, and much more crisped.

358. M. CONIATUS, *B. & Br.* Pileo campanulato fulvo sulcato particulis pulverulentis obsito; stipite setaceo glaberrimo; lamellis distantibus adnexis (no. 101 in part).

On dead leaves &c.

Pileus ¼ inch across, campanulate, deeply sulcate, covered with little dust-like particles, tawny; stem of the same colour, setaceous, grooved and twisted when dry, springing from a white uniform stratum on the leaves, but rather yellow when attached to particles of sand.

359. M. PELLUCIDUS, *B. & Br.* Pileo planiusculo pellucido; stipite æquali brunneo subtiliter pulverulento; lamellis distantibus angustis albis liberis; interstitiis lævibus (no. 38 cum icone).

On dead twigs &c. Nov. 1867.

Pileus ½–1 inch across, thin, convex, then nearly plane; stem brown, pulverulent; gills very narrow, free.

Sent with *M. crispatus*; but the gills are very different, as is the pellucid aspect.

360. M. SEMIPELLUCIDUS, *B. & Br.* Pileo campanulato sulcato spadiceo; stipite sursum pellucido, deorsum opaco, toto striato; lamellis albis (no. 101 in part).

On dead twigs &c.

Pileus 1–2 lines across; stem $\frac{1}{2}$ an inch high.

Differs from other species with which it might be confounded in the upper part of the stem being pale and pellucid.

361. M. CORNICOLOR, *B. & Br.* Fasciculatus; pileo convexo umbilicato opaco subcoriaceo glabro; stipite rufo, sursum glabro, deorsum albo tomentoso; lamellis angustis lividis margine pallidioribus crenatis ventricosis confertis subremotis.

On dead twigs &c. Peradeniya, 1600 feet, Nov. 1867. Without any number.

Allied to *M. varicosus*, Fr.

362. M. RHYSSOPHYLLUS, *Mont. MS. Linn. Soc. Journ.* x. p. 294. (No. 751.)

Peradeniya, Sep. 1868.

363. M. SUBAURANTIACUS, *B. & Br.* Cæspitosus; pileo convexo subcarnoso subtiliter tomentoso nitide ochraceo, hic illic aurantiaco tincto; stipite albo fibrilloso; lamellis adnexis, interstitiis venosis (nos. 100 & 397 in part).

On dead wood. Peradeniya, Aug. 1860.

Clustered; pileus $\frac{3}{4}$ inch across, bright ochraceous tinged with orange; flesh thick in the centre; stems $\frac{3}{4}$ inch high, $\frac{1}{2}$–$\frac{3}{4}$ line thick, in bundles of ten or more; gills moderately broad.

Habit of *M. consocius*, B.

364. M. CHONDRIPES, *B. & Br.* Pileo e campanulato depresso umbilicato; stipite elongato cartilagineo; lamellis adnatis (no. 204 in part).

On dead twigs &c.

Pileus about an inch across, umber; stem 1 inch or more high, $\frac{1}{8}$ of a line thick, paler than the pileus, transparent when dry; gills moderately distant.

365. M. UMBRACULUM, *B. & Br.* Pileo convexo-plano obtuso, leviter umbonato, profunde sulcato, rufo; stipite rigido pallidiore lævi glabro; lamellis distantibus citrinis, postice rotundatis, remotis (no. 807, cum icone).

On dead leaves &c. Oct.–Dec. 1868.

Pileus 1 inch across, of a rich rufous red turning brown when dry, deeply sulcate; stem $2\frac{1}{2}$–3 inches high, not $\frac{1}{2}$ a line thick, perfectly even when dry; interstices of gills quite even or venous.

366. M. RADIANS, *B. & Br.* Pileo infundibuliformi albicante glabro lævi; stipite sursum dilatato e strato tenui albo oriundo, basi fibris radiantibus strigosis ornato; lamellis ochraceis angustis decurrentibus (no. 103).

On dead sticks and stems of herbaceous plants. Peradeniya, Nov. 1867.

Pileus ½ inch across, deeply infundibuliform; stem ¾–1 inch high, about 1 line thick, with tawny radiating fibres at the base.

Some of the specimens have become whitish, probably from the attack of some mould.

367. M. MUTABILIS, *B. & Br.* Pileo depresso, e pallido rufo; stipite brunneo, e basi orbiculari floccosa oriundo; lamellis decurrentibus, interstitiis venosis (no. 204 in part).

On dead sticks &c.

Pileus ¾ inch across, pale, dun-coloured when fresh, almost red-brown when dry, infundibuliform; stem ½–1 inch or more high, dark brown, smooth, splitting, springing from an orbicular fibrillose base, and sending out here and there some dark brown fibres; gills distant, decurrent, rather broad; interstices venous.

Analogous to *Cantharellus rubidus*; but in that the veins are obtuse and the stem of a totally different texture, and not opaque but transparent when dry.

368. M. PROXIMUS, *B. & Br.* Pileo convexo helvolo, sicco rufo, subtomentoso; stipite brevi fusco hirtello; lamellis distantibus adnatis, interstitiis lævibus (no. 93 in part).

On dead sticks &c. Peradeniya, July 1868.

Pileus ⅓ inch across; stem ¼ inch high, not ½ a line thick.

Allied to *M. mutabilis.*

369. M. SUBCINEREUS, *B. & Br.* Pallide cinereus; pileo convexo umbilicato, usque ad umbilicum striato, tenuissimo; stipite sursum incrassato, insititio, intus (apice excepto) saturatiore, farcto; lamellis arcuatis breviter decurrentibus, interstitiis venosis (no. 782, cum icone; no. 204 in part).

On dead twigs &c. Sep.–Nov. 1868.

Pileus ⅖ inch across, convex, distinctly umbilicate, delicately striate up to the umbilicus, pale cinereous; stem ¾ inch high, ¾ line thick above, darker within (except above, where it is nearly white); gills arcuate, shortly decurrent, moderately distant, interstices venous, sometimes reticulate.

No. 804 agrees so nearly with this, except in its being rather more coarsely sulcate, that we consider it a variety.

Var. subcitrinus, pileo pallide citrino sulcato leviter umbilicato; stipite deorsum rufescente.

370. M. OBSCURATUS, *B. & Br.* Pusillus; pileo convexo plano fumoso; stipite setiformi, pellucido, basin versus pulveraceo; lamellis ochraceis decurrenti-adnatis.

On dead leaves. Peradeniya, Nov. 1867.

Pileus not exceeding 2 lines across, dull ochraceous; stem about 5 lines high, pellucid, setiform; gills shortly decurrent.

371. M. EXIMIUS, *B. & Br.* Fulvus; pileo profunde umbilicato, margine lobato; stipite fusco fissili; lamellis longe decurrentibus, interstitiis venosis (no. 95).

On dead sticks &c. Peradeniya, 1600 feet, Nov. 1867.

Pileus 1¼ inch across; stem ½ inch, dilated above.

372. M. RIVULOSUS, *B. & Br.* Pileo campanulato tenui pallido, usque ad umbonem sulcato; stipite cinereo pulverulento albo-farcto; lamellis angustis arcuatis adnato-decurrentibus (no. 791, cum icone).

On dead wood. Peradeniya, Nov. 1868.

Pileus nearly 2 inches across, pinkish white, thin, broadly campanulate, with a small papilliform umbo, deeply and repeatedly sulcate; stem 2½ inches high, rather more than a line thick, cinereous externally, red brown within stuffed with white; gills arched, narrow in front, shortly decurrent, pinkish.

373. M. PRASINUS, *B. & Br.* Pileo viridi depresso subcarnoso sulcato glaberrimo; stipite pallido; lamellis angustis ochraceis decurrentibus.

On dead twigs &c.

Pileus 1½ inch across, of a delicate greyish green; margin irregular, sulcate; flesh white; stem 1½ inch high, ¾ line thick; gills arcuate decurrent.

No. 862 seems to be a smaller form of the same species with broader gills and venous interstiees.

374. M. NIVOSUS, *B. Hook. Journ.* 1856, p. 139. (No. 932.)

On dead twigs &c. Peradeniya, Dec. 1868.

375. M. HELVOLUS, *B. Hook. Kew Misc.* viii. p. 136.

Var. *brunneolus*, pileo lamellisque brunneolis (no. 752).

On dead sticks. Peradeniya, Sep. 1869.

376. M. HÆMATOCEPHALUS, *Mont. Cub.* p. 418. (No. 752, cum icone; no. 807**.)

On dead twigs &c. Peradeniya, Sep. 1868.

377. M. ATRORUBENS, *B. Lond. Journ. Bot.* i. p. 188 (No. 101 in part.)

On dead twigs &c. Peradeniya, July, Aug. 1868.

378. M. FULVICEPS, *B. Hook. Lond. Journ.* 1847, p. 490. (No. 807*.) Peradeniya, Dec. 1868.

379. M. HEMIBAPHUS, *B. & Br.* Pileo convexo umbonato sulcato fulvo; stipite rigido flexuoso striato nec torto; lamellis latiusculis, interstitiis venosis (no. 204 in part).

On dead sticks &c. Pileus ½–1¼; much less bright in colour than the following, but differing more especially in the nature of the stem, which is 2 inches high, 1 line thick.

380. M. FLORIDEUS, *B. & Br.* Pileo plano subumbonato sulcato atrorubro; stipite concolori striato torto; lamellis latiusculis distantibus ochraceis (no. 204 in part).

On dead wood. Nov. 1867. Pileus ½–1½ inch across, margin inflexed; stem 1–2 inches high, 1 line thick, strongly twisted; gills distinct, interstices veined.

381. M. TORTIPES, *B. & C. Journ. Linn. Soc.* x. p. 298. (No. 156.) On dead twigs &c. Peradeniya.

382. M. HIRTELLUS, *B. & Br.* Pileo convexo sulcato, demum subumbilicato; stipite setiformi striato torto hispido; lamellis confertis adnexis ochraceis (no. 102 in part).

On dead herbaceous plants. Nov. 1867.

Pileus 4–5 lines broad; stem springing from a thin membrane with a few flocci; stem 1 inch (or more) high, finely hispid.

383. M. THWAITESII, *B. & Br.* Pileo cylindrico fusco sulcato processibus conicis echinato; stipite setaceo concolori (no. 827, cum icone).

On dead herbaceous stems. Oct.–Dec. 1868.

Pileus 1½ line high, 1 line across, brown, more rufous when dry, sulcate, covered above with conical echiniform warts, the crenation of the margin being in some cases similarly produced.

384. M. INUSTUS, *B. & Br.* Pileo primum convexo, demum explanato irregulari, glabro, albido, hic illic cinereo; stipite brevi, pruinoso; lamellis paucis, interstitiis non reticulatis.

On dead herbaceous plants. 1854.

About ½ an inch high.

385. M. ACTINOPHORUS, *B. & Br.* Pusillus; pileo convexo umbilicato spadiceo radiato-picto, sicco rugoso; stipite setaceo, pallido; lamellis albis (no. 1164, cum icone).

On dead twigs &c.

Pileus 2½ lines across, convex, umbilicate, red-brown, with about ten paler rays; stem ½ inch high, ¼ line thick, twisted.

386. M. PROLETARIUS, *B. & C. Journ. Linn. Soc.* x. p. 296. (No. 1170, cum icone.)

On dead leaves &c.

387. M. ROTALIS, *B. & Br.* Pileo hemisphærico umbilicato quandoque umbonato sulcato pulverulento umbrino; stipite setiformi nigro nitido insititio (no. 810).

On dead leaves &c. Aug. Dec. 1867, 1868, Jan. 1869.

Pileus 1 line across, with about 12 deep grooves, umbilicate, with sometimes a minute umbo at the base of the umbilicus; stem ½–1 inch high.

This is *M. rotula*, var. *fuscus*, of the Cuban Fungi. *M. flosculus*, B., though the pileus is somewhat similar, has a very different stem.

388. M. CORTICIGENA, *B. & Br.* Pusillus; pileo convexo sulcato pulverulento; stipite fusco; lamellis paucis cinnamomeis adnatis (no. 955).

On bark. Peradeniya, Dec. 1868.

Pileus 1½ line across; stem 2 lines high, ¼ thick; gills broad, about ten, brighter than the pileus, broadly adnate.

Habit of *Agaricus corticola*.

389. M. STYPINUS, *B. & Br.* Pileo hemisphærico pallido stipiteque brevi insititio floccoso-velutinis; lamellis paucis distantibus breviter adnatis (no. 950).

On dead sticks. Peradeniya, Jan. 1869.

Pileus hemispherical, ¼ inch high, tan-coloured, clothed, as is the paler stem, with velvety flocci; stem ¼ inch high; gills arched, pallid, very distant.

It has just the habit of *Agaricus aridus* and *siparius*, and will come near *M. ramealis* and *amadelphus*.

390. M. IGNOBILIS, *B. & Br.* Albidus, pileo dimidiato conchiformi hædino brevissime stipitato, demum resupinato; lamellis ventricosis, interstitiis venosis.

On dead wood. South of the island.

Pileus about ½ an inch across; gills numerous.

Var. major reniformis vel orbicularis, stipite e bulbillo spongioso oriundo, lamellis breviter adnatis (nos. 100, 396, cum iconibus).

Pileus ¾–1 inch across, smooth; stem ½ an inch high; gills distant, but tolerably numerous. The stem is more highly developed than in the typical form, and the pileus is not resupinate.

391. M. CONFUSUS, *B. & Br.* Pileis confertis albidis resupinatis subtiliter tomentosis; lamellis latis crispatis (no. 397 in part).

On dead wood.

Forming a mass of confluent stemless resupinate pilei, much crisped when dry; interstices even, or with shorter gills interspersed, or more rarely with a few transverse ridges.

392. M. CONCOLOR, *B. & C. Journ. Linn. Soc.* x. p. 299. (No. 685.)

On dead sticks.

393. M. EPOCHNOUS, *B. & C.* Candidus; pileo resupinato tomentoso; stipite brevissimo e strato arachnoideo oriundo; lamellis crassiusculis (no. 683).

On dead sticks. South of the island, July 1868.

Pileus 1 line across; gills distant, but numerous.

Resembling somewhat *M. merulinus* and *spaniophyllus*, but with far more numerous gills than either.

394. M. RUFESCENS, *B. & Br.* Totus rufescens; pileo suborbiculari glabro; stipite brevi cylindrico glabro; lamellis paucis, interstitiis reticulatis (no. 90 in part).

Peradeniya, July–Dec.

Pileus $\frac{3}{4}$–1 inch across; stem 1–1$\frac{1}{2}$ line high.

395. HELIOMYCES CARYOTÆ, *B. Hook. Journ.* 1847, p. 491 (no. 750, cum icone); *Gardn.* (no. 3, cum icone).

On dead twigs &c. Peradeniya, Sept. 1868.

Pileus 1 inch across, deeply sulcate, so as to make fluted folds, pulverulent in the centre; stem 3 inches high, $\frac{3}{4}$ line thick, rigid; gills above 2 lines wide, about sixteen. The colour, when fresh, is pale straw-colour, which changes to dark red-brown in drying.

396. LENTINUS STENOPHYLLUS, *B. Hook. Lond. Journ.* 1847, p. 495; *Gardn.* (no. 34, cum icone); *Thw.* (no. 688, cum icone).

On the ground in open plains, *Gardner*, June 1844. Peradeniya, *Thwaites*, July 1868. Growing to a large size.

397. L. GIGANTEUS, *B. l. c.* p. 493; *Gardn.* (no. 58, cum icone).
On the ground, *Gardner, Thwaites.*

398. L. OBNUBILUS, *B. l. c.* p. 495; *Gardn.* (no. 33, cum icone).
On the ground in shady places, June 1844.

399. L. MACULATUS, *B. l. c.* p. 494; *Gardn.* (no. 39, cum icone).
On the ground.

400. L. CARTILAGINEUS, *B. l. c.* p 496; *Gardn.* (no. 90, cum icone).
Springing from about 4 feet below the surface of the earth, from the comb of Termites. June 1845, *Gardner.*

401. L. EXILIS, *Klotzsch, Fr. Ep.* p. 393; *Gardn.* (nos. 67, 81, cum icone); *Thw.* (no. 609 in part).

Rambukan, Ap. 1868. In tropical forests. Cream-coloured.

402. L. PERCOMIS, *B. & Br.* Pileo ochraceo profunde umbilicato glabro sulcato-striato; stipite brevi subtiliter piloso-squamuloso lamellisque latis integris ochroleucis. *Thw.* (no. 400).

Pileus 3½ inches across, darker towards the margin, which is sometimes lobed; stem 1 inch high, 5 lines thick.

A very neat species.

403. L. VELATUS, *B. & Br.* Pileo depresso subcinereo glabro fragmentis veli candidi sparso; margine involuto appendiculato; stipite sursum dilatato solido, basi cinerascente glabro, sursum albido squarroso-squamoso; lamellis angustissimis albis (no. 1057, cum icone).

Peradeniya, July 1869.

Cæspitose. Pileus 1¼ inch across, sprinkled with fragments of the white veil, portions of which are attached to the involute margin; stem 2 inches high, ⅔ thick above, slightly attenuated below, where it has a cinereous tint, clothed with reflexed membranous scales; gills very narrow, decurrent, white.

The species bears some resemblance to *L. stenophyllus.*

404. L. MULTIFORMIS, *B. & Br.* Pileo orbiculari v. flabellato umbilicato, depresso, v. infundibuliformi pallido squarroso v. depresso-squamoso lobato; stipite pallido parce squamoso; lamellis candidis dentatis (no. 609 in part).

Peradeniya, July.

Pileus about 3 inches across, clothed with pale squarrose or darker adpressed scales; margin repeatedly lobed; stem about 1 in. high, ¼ thick, nearly white; gills white, decurrent.

Allied to *L. submembranaceus* and *cretaceus*, but a much larger species.

405. L. CRETACEUS, *B. & Br.* Pileo orbiculari profunde umbilicato albo striatulo subtiliter tomentoso, postice parce squarroso-squamoso; stipite tenui demum sulcato-striato; lamellis integris decurrentibus pallidis (no. 206 in part).

Nov. 1869.

Pileus ½–1½ inch across, cream-coloured, with a few squarrose scales near the umbilicus; stem ½–¾ inch high, 1 line thick, at first white, with a little scaly down, then striate; gills quite entire.

406. L. INFUNDIBULIFORMIS, *B. & Br.* Pileo eximie infundibuliformi expanso lobato crenato pallide ochraceo, marginem versus saturatiore,

minutissime scabro; stipite elato solido squarroso, sursum brunneo; lamellis angustissimis, acie integris (no. 609 in part).

Central province.

Pileus 5½ inches across, ochre shaded with umber, darker towards the margin; stem 3 inches high, nearly ½ thick, pale below, brown above, clothed with spongy squarrose scales; gills very numerous, decurrent, the brown somewhat velvety matter ascending amongst them.

Somewhat resembling *L. connatus*. There is a variety exactly analogous to that of *L. multiformis*.

407. L. MANIPULARIS, *B. & Br.* Fascicularis; pileo orbiculari umbilicato albo stipiteque curvo totis furfuraceo-squamosis; lamellis tenuibus, acie denticulatis (no. 206 in part).

On dead wood. Peradeniya, 1868.

Fasciculate; pileus 1–1½ inch across, white, clothed, as is the curved stem, with furfuraceous (often squarrose) scales; stem 1 inch high, 1–1½ thick; gills shortly decurrent, thin, edge toothed.

408. L. BLEPHARODES, *B. and C. Journ. Linn. Soc.* x. p. 301. (Nos. 94, 686.)

On dead wood. Also in Cuba. The stem varies from hispid to spongioso-hispid.

409. C. SIMILIS, *B. & Br.* Pileo infundibuliformi sulcato-striato, usque ad umbilicum velutino, margine ciliato; stipite flexuoso duro spongioso-floccoso; lamellis omnibus una decurrentibus integris (no. 686, cum icone).

On dead wood. Central Province.

Pileus 2½ inches across, regularly and beautifully sulcate, cinereous; margin ciliated; stem flexuous.

There is a variety or state with a shorter stem and much less velvety.

410. L. BADIUS, *B. Hook. Lond. Journ.* 1847, p. 491.

On wood in forests, *Gardner*, *Thwaites*.

411. L. HOOKERIANUS, *B. Hook. Kew Journ.* 1851, p. 44. (No. 532 in part.)

On dead wood. Damboul, Nov. 1868.

412. L. STRIGOSUS, *Fr.*

Var. tenuipes. Pileo zonato strigoso; stipite tenui.

413. L. ZONIFER, *B. & Br.* Pileo orbiculari umbilicato fulvo zonato stipiteque hispidis; lamellis angustis integris (nos. 5 & 532 in part).

On dead wood in the hotter parts of the island.

Pileus 2–3 inches across, often lobed, umbilicate, zoned, clothed with short stiff bristles, which sometimes form little fascicles; stem 1¼ inch high, 1–2 lines thick, cylindrical, hispid; gills very narrow.

Allied to *L. strigosus*, Fr., but with much narrower gills, and in some respects approaching *L. velutinus*.

414. L. Lecomtei, *Fr.* (Nos. 399 cum icone, 533.)

On dead wood. Peradeniya, 1868. Central province.

415. L. eximius, *B. & Br.* Pileo subinfundibuliformi brunneo subtiliter lineato squamulosoque, hic illic rimoso, margine fisso; stipite brevi pubescente squamulosoque; lamellis brunneis, omnibus una desinentibus, acie denticulatis.

On dead wood. 1854.

Pileus 6 inches across, of a rich reddish brown, finely lined and sprinkled with minute scales, here and there cracked, margin split; stem $\frac{3}{4}$ inch high, $\frac{1}{4}$ thick, pulverulent, or marked with flat brown scales; gills brown when perfect, fringed with little teeth.

Allied to *L. polychrous*, Lév.

416. L. radicans, *B. & Br.* Pileo lato infundibuliformi vel depresso subcinereo, postice adpresso-squamoso, antice sulcato-striato furfuraceo; stipite radicante, sursum dilatato, reticulato-tomentoso; lamellis decurrentibus (no. 767).

On dead wood. Peradeniya, Sep. 1868.

Pileus $4\frac{1}{2}$ inches across, clothed behind with adpressed scaly patches, in front strongly striate and minutely furfuraceous; stem $3\frac{1}{2}$ inches high, $\frac{1}{3}$ thick, rooting, clothed with reticulated down which runs up to the decurrent entire gills, which are a line or more broad. Often contaminated with particles of sand &c.

417. L. lobatus, *B. & Br.* Pileo ex infundibuliformi multilobato umbrinello, antice glabro, postice stipiteque velutinis, margine inflexo; lamellis pallidis tenuibus (no. 206 in part).

On dead wood.

Pileus $2\frac{1}{4}$ inches across, at first infundibuliform, then variously split, of a pale dingy umber, velvety behind, as in the short stem; stem $\frac{1}{4}$ inch high, 2 lines thick.

418. L. estriatus, *B. & Br.* Pileo excentrico rigido fulvo-velutino, margine incurvo; stipite brevi subtiliter squamuloso velutinoque; lamellis brunneis decurrentibus denticulatis.

On dead wood.

Pileus 4 inches across, clothed with short tawny velvety down, margin inflexed; stem 1 inch high, 5 lines thick, curved, minutely squamulose above, with a little fine velvety down; gills brown, like those of *L. eximius*, to which it is closely allied, but with a very different pileus.

419. L. revelatus, *B. Hook. Lond. Journ.* 1847, p. 492; *Gardn.* (no. 117).

On dead wood. Point de Galle.

420. L. APALUS, *B. & Br.* Albus tener glaber nitidus infundibuliformis; stipite glabro, sicco lineato; lamellis decurrentibus (no. 725).
On the ground. Peradeniya, Aug. 1868, Jan. 1869.
Pileus 1 inch across, not striate; stem $\frac{1}{2}$–$\frac{3}{4}$ inch high.

Allied to *L. cladopus* and *leucochrous*; but the stem is very different.

421. PANUS CORIACEUS, *B. & Br.* Pileo dimidiato subreniformi coriaceo rufo zonato, postice velutino, antice lineato rugoso, margine tenui crenato; lamellis ventricosis pallidis (no. 1124).
On dead wood. Central province, Feb. 1869.
Pileus 1–2 inches across, coriaceous, zoned, of a rich red-brown, velvety behind, marked in front with minute raised lines which sometimes form reticulations; gills pallid, spinulose.

422. P. GLANDULOSUS, *B. & Br.* Pileo convexo umbonato minute sericeo esquamuloso; stipite radicante fulvo materie tenui spongiosa vestito; lamellis decurrentibus, acie glandulosis (no. 1145).
About 1 inch across; stem $1\frac{1}{2}$ inch high, 2 lines thick, solid.

423. P. CRASSIUSCULUS, *B. & Br.* Pileo reniformi horizontali ochroleuco, subtiliter tomentoso, crassiusculo; lamellis angustis e puncto marginali radiantibus, acie obtusis (no. 1143).
Central province, March 1869.
Pileus $1\frac{1}{4}$ inch across, 1 inch long.

424. XEROTUS BERTIERII, *Mont. Fl. Chil.* vii. p. 353. (No. 392.)
On dead wood. Habgalla.

425. X. LATERITIUS, *B. & C. Journ. Linn. Soc.* x. p. 303. (No. 393.)
On dead wood. Peradeniya, Feb. 1869. Central province.

426. X. TENER, *B. & Br.* Pileo reniformi tenui membranaceo umbrino pulverulento; stipite brevissimo; lamellis concoloribus angustissimis; interstitiis lævibus (no. 687).
On dead wood. South of the island, July 1868.
Pileus about $\frac{1}{2}$ an inch across, far thinner than in the more typical species.

427. TROGIA INFUNDIBULIFORMIS, *B. & Br.* Fuscus; pileo infundibuliformi subtiliter striato, margine acute crenato; stipite brevi, basi piloso, e strato orbiculari oriundo; venis decurrentibus, interstitiis lævibus (no. 685 in part).
On dead wood and sticks. South of the island, July 1868.
Pileus 1–$1\frac{1}{2}$ inch across; edge jagged; stem $\frac{1}{2}$–1 inch high, 1–$1\frac{1}{2}$ line thick.

This appears to be a true *Trogia*, approaching *Cantharellus*.

428. T. BICOLOR, *B. & Br.* Pileo ex infundibuliformi flabellato umbrino; stipite concolori e basi polita oriundo; hymenio pallido, venis decurrentibus (no. 685 in part).

On dead wood. South of the island.

Pileus ½ an inch or rather more across, not striate; stem ⅓ inch high, ¾ line thick, striate, springing from an orbicular polished disk, which is slightly fimbriated; veins decurrent here and there, distinctly bifid.

429. SCHIZOPHYLLUM COMMUNE, *Fr.* (No. 39 in part.)

On dead wood. Peradeniya, Nov. 1869.

430. S. MULTIFIDUM, *Fr.* (No. 39 in part.)

On dead wood. Peradeniya, Dec. 1854.

431. LENZITES APPLANATA, *Fr.*

On dead wood.

432. L. DEPLANATA, *Fr.* (No. 224.)

On dead wood.

433. L. REPANDA, *Fr.* (no. 962); *Gardn.* (nos. 68, 120).

On dead wood. Central province.

434. L. ASPERA, *Kl., Linn.* 1833, p. 480; *Gard.* (no. 83).

On dead wood.

435. BOLETUS PORTENTOSUS, *B. & Br.* Maximus, brunneus; pileo centro depresso, carne citrina immutabili sub cuticula lurida; stipite crasso, basi dilatato, radicante, tubis citrinis (no. 1214, cum icone).

On the ground. June 15, 1869.

Pileus 8 inches across, convex, depressed in the centre, dull olivaceous brown; extreme margin projecting beyond the tubes, subacute; flesh an inch or more thick, lemon-coloured, brownish beneath the cuticle; stem 3½ inches high, 2 thick in the centre, sulcate below, of the same colour as the pileus, tinged with red brown within; thickened at the base, which ends abruptly; tubes adnexed lemon-coloured, ½ an inch long.

Allied to *B. æstivalis.*

436. POLYPORUS (MESOPUS) ARCULARIUS, *Fr.* (No. 177.)

On dead wood. Talagalla &c., *Gardner.*

437. P. (MESOPUS) OLIVACEO-FUSCUS, *B. & Br.* Totus olivaceo-fuscus; pileo carnoso convexo pulverulento-tomentoso; stipite deorsum incrassato ventricoso pulverulento rugoso; poris brevissimis minutissimis decurrentibus (no. 826).

On dead wood. Kandy, Oct. 1868.

Pileus 2 inches across, convex, fleshy, dull olive-brown, covered with pulverulent down, edge incurved, acute; stem 1½ inch high, ⅔–1 inch

thick in the centre, $\frac{1}{2}$ at the apex, attenuated upwards, longitudinally rugose, pulverulent; pores very short (not $\frac{1}{2}$ a line) decurrent.

Allied to *Pol. ovinus*.

438. P. (MESOPUS) OBLECTANS, *Berk. Hook. Lond. Journ.* 1845, p. 51; *Gard.* (no. 60, cum icone).
On the ground.

439. P. (MESOPUS) RUGOSUS, *Nees* (no. 728, cum icone); *Gard.* (no. 57).
On the ground. Peradeniya, July 1868.
Pileus when fresh somewhat brick-coloured; stem stuffed.

440. P. (MESOPUS) XANTHOPUS, *Fr.* (No. 377 in part.)
On dead wood.

441. P. (MESOPUS) HEMICAPNODES, *B. & Br.* Pileo coriaceo infundibuliformi vel profunde umbilicato glabro, primum minutissime sericeo-lineato; stipite nigro pubescente; poris albis minutis decurrentibus (no. 600).
On dead wood. Dolosbagey, May 1868.
Pileus 1–1$\frac{1}{2}$ inch across, ochraceous, margin slightly lobed; stem fixed by a circular disk; pores $\frac{1}{120}$ inch in diameter, edge obtuse.

Allied to *P. nummularius*.

442. P. (PLEUROPUS) PICIPES, *Fr.* (No. 403.)
On dead wood.

443. P. (PLEUROPUS) SANGUINEUS, *Fr.* (no. 381); *Gardner* (no. 111).
On wood, bamboo, &c.

444. P. (PLEUROPUS) FLABELLIFORMIS, *Kl.* (No. 377 in part.)
On dead wood. Central province, 1868.

445. P. (PLEUROPUS) DISCIPES, *Berk. Hook. Lond. Journ.* 1847, p. 499.
On dead wood. Talagalla, *Gardner*.

446. P. (PLEUROPUS) MENZIEZII, *B.* Pileo flabelliformi disco parvo affixo zonato subtiliter tomentoso; poris subhexagonis; margine angusto sterili.
On dead wood. Originally gathered by Menzies in Sumatra.
Pileus 1–1$\frac{1}{4}$ inch long, pale umber; pores $\frac{1}{60}$ inch in diameter. The Ceylon specimens have the pores a little wider ($\frac{1}{48}$ inch), but differ in no essential point.

447. P. (PLEUROPUS) RHIPIDIUS, *B. Hook. Lond. Journ.* 1847, p. 319. (Nos. 1, 363.)

Common in tropical forests. South of the island, July 1868.

448. P. (PLEUROPUS) DILATATUS, *B. l. c.* p. 499; *Gardn.* (no. 599). On dead wood. Dolosbagey, cent. pr., May, Dec. 1868. Sometimes proliferous.

449. P. (PLEUROPUS) RUSSICEPS, *B. & Br.* Pileo suborbiculari, postice in stipitem brevem angustato rufo, pulverulento scabrosove; cuticula in venas vagas hic illic vellicata; margine ciliato; hymenio albo; poris parvis, dissepimentis tenuibus (no. 961, cum icone).

On dead wood.

Pileus 3 inches or more across, of a bright rufous brown, clothed with pulverulent hispid down, the cuticle being here and there pinched up into veinlike simple or branched processes; hymenium white when fresh, acquiring a slightly rufous tinge in drying. Pores $\frac{1}{72}$ inch in diameter.

The pileus resembles that of *Favolus ruficolor*.

450. P. (MERISMA) SULFUREUS, *Fr.* (No. 601.)
On dead wood. Dolosbagey, May 1868.

451. P. (MERISMA) EUROCEPHALUS, *B. & Br.* Maximus imbricatus ex axi communi oriundus; pileis planis dilatatis luteo-umbrinis pulverulento-tomentosis tenuioribus; contextu carnoso albo, poris parvis, inæqualibus, labyrinthiformibus, ochraceis; dissepimentis tenuibus (no. 969).

On dead wood. Peradeniya, Jan. 1869.

Pilei several inches across, $3\frac{1}{2}$ inches long, when dry of a dull ochre; pores $\frac{1}{50}$ inch in diameter.

452. P. (ANODERMEI) LACTEUS, *Fr.*
On dead wood, *Gardner*.

453. P. (ANODERMEI) APPENDICULATUS, *B. & Br.* Pileo reniformi subimbricato, postice attenuato, subtiliter tomentoso crassiusculo, leviter radiato-sulcato; poris parvis; dissepimentis tenuibus lacerato-appendiculatis.

On dead wood.

Pileus 3 inches across, $1\frac{1}{2}$ long, white, with a slight cinereous tinge towards the edge; pores $\frac{1}{80}$ inch in diameter, variable.

454. P. (ANODERMEI) DISSITUS, *B. & Br.* Tenuis orbicularis, uno latere reflexus, sericeus zonatus pallide fulvus; hymenio cinereo; poris irregularibus parvis cito fractis, hic illic sæpissime interruptis (no. 966).

On dead sticks. Cent. prov., 1868.

At first orbicular, with a narrow byssoid margin, then reflexed on one

side; hymenium with frequent patches, in which the pores are undeveloped.

Allied to *P. adustus*. Very thin.

455. P. (PLACODERMEI) POLYTROPUS, *B. & Br.* Durus; pileo dimidiato lignicolori radiato-rugoso subcostato; contextu porisque minutis cervinis (no. 604).

On dead wood. Dolosbagey, 1868.

Pileus 1–3 inches across, $1\frac{1}{4}$–2 inches long, hard, woody, sometimes zoned at first and tomentose, near the margin radiato-rugose; sometimes shining; variable in thickness; pores $\frac{1}{150}$ inch in diameter, larger than in *P. Auberianus*, to which it is nearly related. Sometimes strongly decurrent.

456. P. (PLACODERMEI) KERMES, *B. & Br.* Pileo dimidiato conchiformi sulcato-zonato velutino scabro lateritio; contextu cinnabarino; hymenio pallido marginato, poris minutis (no. 970).

On dead wood. Cent. prov., Dec. 1868.

Pileus 1–2 inches across, $\frac{3}{4}$–1 inch long, repeatedly concentrically sulcate, velvety, brick-red, with smoother brown zones; hymenium pale; margin obtuse, sometimes sulcate like the pileus; substance vermilion; pores $\frac{1}{150}$ inch in diameter.

457. P. (PLACODERMEI) RUBIDUS, *B. Hook. Lond. Journ.* 1847, p. 500; *Gardn.* (no. 96).

On fallen trees in woods. Point de Galle.

Also sent by Mr. Thwaites.

458. P. (PLACODERMEI) ZONALIS, *B. Ann. Nat. Hist.* x. p. 375.

On dead wood. Dolosbagey, May 1868.

No. 608 is a resupinate form.

459. P. (PLACODERMEI) CARTILAGINEUS, *B. & Br.* Pileo dimidiato vel centro affixo e rufo-fuligineo subzonato; cuticula cartilaginea tuberculis postice tendentibus ornata; contextu albido, demum pallide fusco; poris minutis (no 605 in part).

On dead wood. Dolosbagey, May 1868.

Pileus about an inch across, $\frac{1}{2}$–$\frac{3}{4}$ long, sometimes furnished with a spurious stem; tubercles papilliform; pores $\frac{1}{120}$ inch in diameter.

A very curious species.

460. P. (PLACODERMEI) AUSTRALIS, *Fr.* (nos. 379, 380); *Gardn.* (no. 75).

On dead wood.

461. P. (PLACODERMEI) IGNIARIUS, *Fr.*, var. *applanatus*; *Gardn.* (no. 110).

On dead wood.

MISSOURI

462. P. (Placodermei) fulvus, *Fr.* (No. 367.)
On dead wood.

463. P. (Placodermei) senex, *Mont. Cub.* p. 403. (No. 565.)
On dead wood. Cent. prov., 1868.
One form repeatedly zonato-sulcate.

464. P. (Placodermei) licnoides, *Mont. Cub.* p. 401. (No. 261.)
On dead wood.

Not so closely zoned as in the original specimens, but very variable.

465. P. (Placodermei) isidioides, *B. Hook. Lond. Journ.* 1843, p. 415.
On dead wood.

466. P. (Placodermei) holosclerus, *B. Hook. Lond. Journ.* 1847, p. 501.
On dead wood: *Thwaites, Gardner.*

467. P. (Placodermei) ferreus, *B. Hook. Lond. Journ.* 1847, p. 502 (397 in part); *Gardn.* (nos. 104, 106).
On dead wood: *Gardner, Thwaites.*

468. P. (Placodermei) anebus, *B. l. c.* p. 504.
On dead wood: *Gardner.*

469. P. (Placodermei) dochmius, *B. & Br.* Pileo dimidiato obliquo duro glabrescente zonato fasciato radiato-rugoso lineatoque, margine tomentoso; contextu pallido; hymenio ochroleuco, poris punctiformibus.
On dead wood.
Pileus 3½–4 inches across, 2½ long, oblique, repeatedly zoned with brown and umber, marked with radiating elevations and raised lines towards the margin; edge fawn-coloured, tomentose.
Allied to *P. ferreus.*

470. P. (Placodermei) Persoonii, *Fr.* (No. 224.)
On dead wood. Nov. 1867.
Mycelium rhizomorphoid.

471. P. (Inodermei) caperatus, *B. Ann. Nat. Hist.* x. p. 391. (No. 210.)
On dead wood. Damboul, March 1868.

472. P. (Inodermei) cichoraceus, *B.*—P. intybaceus, *B. Hook. Lond. Journ.* 1842, p. 149.
On dead wood. 1854.

473. P. (INODERMEI) SETIPORUS, *B. Hook. Lond. Journ.* 1847, p. 505. (No. 375.)

On dead wood. Cent. prov., 1868.

474. P. (INODERMEI) STRIGATUS, *B. l. c.* p. 502; *Gardn.* (no. 123).

On fallen trees in forests, *Gardner*.

475. P. (INODERMEI) VITTATUS, *B. l. c.* p. 505.

On dead wood. Talagalla, *Gardner*.

476. P. (INODERMEI) ALBO-CERVINUS, *B. Hook. Kew Journ.* 1856, p. 234.

On dead wood.

Hymenium darker than in the river-Amazon plant.

477. P. (INODERMEI) VENUSTUS. *B. Hook. Lond. Journ.* 1845, p. 55. (No. 530.)

On decaying boards. Peradeniya, March 1868.

A resupinate form.

The original, from Swan River, was on *Casuarina*.

478. P. (INODERMEI) PERADENIÆ, *B. & Br.* Pileo dimidiato, basi decurrente, lateraliter confluente, subzonato, sericeo, membranaceo, pubescente, olivaceo, longitudinaliter rugoso, margine pallidiore; hymenio pallide olivaceo vel sublateritio, poris mediis brevibus, dissepimentis rigidis acutis, margine sterili (no. 221).

On dead wood.

Pileus 1 inch across, $\frac{3}{4}$ long; hymenium varying from flesh-colour to yellowish olive; pores $\frac{1}{36}$ wide. Occurs also in the Neilgherries. Often resupinate.

479. P. (INODERMEI) PERSONATUS, *B. & Br.* Pileo dimidiato zonato tomentoso; poris amplis angulatis carneis vel fulvellis acie acutis (nos. 133, 535).

On dead sticks &c.

Pileus $\frac{3}{4}$–1 inch across, dimidiate, sometimes attenuated behind and fixed by the vertex, tomentose, with a few zones, dirty white behind, pale tawny in the younger parts; pores $\frac{1}{24}$ inch in diameter, varying from flesh-colour to pale tawny, both tints sometimes occurring in the same hymenium. Often resupinate and spreading widely.

Before examination of the hymenium it looks like some form of *Stereum hirsutum*.

480. P. (INODERMEI) HIRSUTUS, *Fr.* (Nos. 378, 564.)

On dead wood. Damboul, March 1868.

No. 564 is a variety with rather larger pores, resembling specimens from the Neilgherries and a Swedish one from Fries.

MISSOURI

481. P. (INODERMEI) VERSICOLOR, *Fr.* (Nos. 374, 563, 965, 1123.)
On dead wood. Damboul, March 1868; cent. prov., Feb. 1869.

482. P. (INODERMEI) ELONGATUS, *B. Hook. Lond. Journ.* 1842, p. 140. (No. 373.)
On dead wood. 3000–4000 feet, *Thwaites, Gardner.*

483. P. (INODERMEI) SECERNIBILIS, *B. l. c.* 1847, p. 500.
On dead wood. Talagalla, *Gardner.*

484. P. (INODERMEI) PHOCINUS, *B. & Br.* Pileo tenui subflabelliformi lobato coriaceo zonato, antice velutino subolivaceo, postice umbrino subsericeo; contextu rufo-umbrino; hymenio cinereo albicante, poris parvis, dissepimentis margine tenuibus hic illic elongatis (no. 210).
On dead wood.

Much thinner and more delicate than *P. caperatus*, to which it bears a distant resemblance; it differs from the *versicolor* series in the dark substance; pores $\frac{1}{60}$ inch wide.

485. P. (INODERMEI) THWAITESII, *B. Hook. Kew Journ.* 1854, p. 229.
Var. *umbrino-tinctus.*
On dead wood.
Pileus reniform, hollowed out, umber behind, as also the hymenium, instead of white.

486. P. (RESUPINATI) OBLIQUUS, *Fr.* (No. 213.)
On dead wood. Nov. 1867.

487. P. (RESUPINATI) ACUPUNCTATUS, *B. & Br.* Effusus, limitatus, pallide umbrinus, intus ferruginosus; poris obliquis, margine sterili (no. 651).
On dead wood. South of the island, July 1868.
Forming irregular lobed determinate patches of various sizes; hymenium dull pallid umber; pores obliquely punctate, minute, the dissepiments raised so as to present somewhat the appearance of a *Porothelium.* Varying in thickness from a line to $\frac{1}{3}$ of an inch; pores stratose.

Allied to *P. obliquus.*

488. P. (RESUPINATI) CONTIGUUS, *Fr.* (Nos. 389, 653.)
On dead wood.

No. 653, from the south of the island, differs from the normal state in the smaller pores.

489. P. (RESUPINATI) VARIOLOSUS, *B. & Br.* Orbicularis, effusus, tenuis, coriaceus, umbrinellus, secernibilis, subtus tomentosus spadi-

ceus; poris subconcentricis amplis hexagonis, dissepimentis rigidis (no. 650).

On dead wood. South of the island, July 1868.

Pores $\frac{1}{24}$ inch in diameter.

490. P. (Resupinati) melleus, *B. & Br.* Totus resupinatus, luteus, margine tenui subbyssoideo, poris amplis angulatis; dissepimentis rigidis (no. 535 in part).

On dead wood. Cent. prov., Feb. 1869.

Spreading for several inches, yellow, especially towards the margin; pores $\frac{1}{24}$ inch in diameter, sometimes larger.

491. P. (Resupinati) diversiporus, *B. & Br.* E resupinato margine reflexo cervino tomentoso lineato-rugoso; poris amplis concoloribus hexagonis, acie rigidis (no. 535 in part).

On dead wood. Cent. prov., Dec. 1867.

Pores $\frac{1}{30}$ inch in diameter.

There is a form from the same locality with the pores $\frac{1}{18}$ inch across.

492. P. (Resupinati) niger, *B. Hook. Lond. Journ.* 1845, p. 304; var. *poris minoribus* (no. 261).

On petioles of *Ravenala speciosa.*

Pores $\frac{1}{180}$ inch in diameter.

493. P. (Resupinati) Ravenalæ, *B. & Br.* Totus resupinatus tenuissimus immarginatus niger, quandoque cærulescens, poris minutis reticulatis.

On petioles of *Ravenala speciosa.*

Pores $\frac{1}{120}$ inch wide, of the same size as in typical *P. niger.*

494. P. (Resupinati) fuligo, *B. & Br.* Totus resupinatus immarginatus livido-niger tenuissimus, poris minutissimis reticulatis (no. 967).

On dead palm wood. Peradeniya, Dec. 1868.

Spreading for many inches, varying from livid black to soot-colour; pores quite invisible to the naked eye, so that it looks like a *Corticium,* $\frac{1}{300}$ inch in diameter.

Clearly allied to the last species.

495. P. (Resupinati) aneirinus, *Fr.* (No. 371.)

On dead wood.

496. P. (Resupinati) Vaillantii, *Fr.* (No. 161.)

On the bare ground and very rotten wood in damp places. Peradeniya.

497. P. (Resupinati) vaporarius, *Fr.* (Nos. 367, 369.)

On decayed wood.

498. P. (Resupinati) vulgaris, *Fr.* (Nos. 367, 369 in part.)
On decayed wood. Cent. prov.

499. P. (Resupinati) callosus, *Fr.* (No. 370.)
On decayed wood. Cent. prov.
Not uncommon.

500. P. (Resupinati) vinctus, *B. Ann. Nat. Hist.* 1852. (No. 208.)
On dead wood. Nov. 1867.

501. P. (Resupinati) subvinctus, *B. & Br.* Crassiusculus, late effusus, albus, secernibilis, margine obliquo tomentoso candido, poris elongatis punctiformibus, contextu candido (no. 603).
On dead wood. Dolosbagey, May 1868.
Several inches broad, effused, rather thick, with an oblique border 2 lines or more broad; rather contracted when dry.

502. P. (Resupinati) epimiltinus, *B. & Br.* Crassus, effusus; hymenio cinnamomeo, sicco pallido; poris minimis obliquis; mycelio sparso submiltino (no. 209).
On dead wood. Nov. 1867.
Habit like that of *P. subvinctus,* contracted when dry; pores $\frac{1}{150}$ inch wide.

503. P. (Resupinati) Stephensii, *B. & Br. Cooke, Handbook,* p. 284. (No. 971.)
On dead wood.

504. P. (Resupinati) hydnophorus, *B. & Br.* Pulvinatus, crassiusculus, determinatus, margine erecto aculeis brevibus obtusis sparso (nos. 367, 369 in part).
On dead wood.

This curious species occurred with *P. vulyaris,* to which it at first bears some resemblance, but forms little cushions, the margin of which is sprinkled with clavate bodies resembling the prickles of a *Hydnum.* The pores, moreover, are about $\frac{1}{96}$ of an inch in diameter, while those of the accompanying *P. vulgaris* are $\frac{1}{120}$.

505. P. (Resupinati) leptodermus, *B. & Br.* Effusus, limitatus, hædinus; hymenio hic illic elevato; poris labyrinthicis, primitus tomentosis (no. 1033).
On dead wood. Cent. prov., Jan. 1869.
Forming a thin membrane like kid leather; the hymenium has little prominences, which have incipient pores upon them, which look like *Pezizæ*; mycelium white, fibrous.

506. P. (Resupinati) calceus, *B. & Br.* Totus resupinatus, effusus, margine tenuissimo adnato membranaceo; poris minimis angulatis, dissepimentis tenuibus (no. 598).

On dead wood. Dolosbagey, May 1868.

At first resembiing *Corticium calceum.* Two forms occur:—that to which the above diagnosis applies; the other rather thicker, with a more membranaceous margin, perhaps from growing on decomposed fibrous wood. Pores in the first $\frac{1}{180}$ in diameter, in the latter $\frac{1}{150}$. It is indeed possible that they may be two distinct species; but there is scarcely any assignable difference.

507. P. (Resupinati) niphodes, *B. & Br.* Totus resupinatus, niveus, margine angustissimo porisque irregularibus pulverulentis (no. 652).

On sticks and wood. South of island, July 1868.

Spreading for several inches, dead white, sometimes in age acquiring a slightly ochraceous tinge; pores pulverulent, in some cases decurrent and resembling those of *Hymenogramme.*

508. P. (Resupinati) interruptus, *B. & Br.* Totus resupinatus, ochraceus, substrato ceraceo hic illic sterili; poris minutis dissepimentisque rigidis (no. 652 in part).

With the last, but very different.

Pores $\frac{1}{84}$ inch wide.

Allied to *P. tardus*, B., a Swan-River species.

509. P. (Resupinati) epilinteus, *B. & Br.* Totus resupinatus, effusus, margine contextuque fibroso, hymenio subcarneo, poris minutis (no. 605).

On dead wood.

Resembling *P. vinctus*; but the margin is different, as is also the substance. Pores $\frac{1}{180}$ inch in diameter, in *P. vinctus* $\frac{1}{144}$.

510. Trametes colliculosa, *B. Hook. Lond. Journ.* 1847, p. 506 (no. 568); *Gardn.* (no. 97).

On dead wood. Damboul, March 1868.

Pores $\frac{1}{20}$ inch across.

511. T. rugosa, *B. & Br.* Ochroleuca, pileo dimidiato crasso radiato-rugoso subzonato, contextu pallide fulvo, poris mediis.

On charred wood. Cent. prov., 1868.

Pileus $4\frac{1}{2}$ inches across, $2\frac{1}{2}$ long, dimidiate, rough, with small radiating ridges, and marked with about three depressed zones, very minutely pubescent; margin slightly lobed; pores $\frac{1}{24}$ inch in diameter, nearly round; edge even, obtuse.

A much coarser species than the last, which came under the same number.

512. T. LOBATA, *B. Hook. Kew Journ.* 1851, p. 84. (No. 257.)
On dead wood.

513. T. LÆTICOLOR, *B. Ann. Nat. Hist.* x. p. 374.
On dead wood: *Gardner.*

514. T. OCCIDENTALIS, *Fr. Ep.* p. 491; *Gardn.* (nos. 77, 95, 122).
On dead wood: *Thwaites, Gardner.*

515. T. GIBBOSA, *Fr.* (No. 406.)
On dead wood.

516. T. LEVIS, *B. Hook. Lond. Journ.* 1847, p. 507. (No. 121.)
On dead wood: *Thwaites, Gardner.*

517. T. VERSIFORMIS, *B. & Br.* Alba, e resupinato reflexa lobata; pileo radiato-rugoso opaco; poris demum labyrinthiformibus (no. 968).

On dead wood. Cent. prov., 1868.

Varying extremely in thickness; sometimes thin and almost membranaceous, sometimes 1-2 lines thick; pores $\frac{1}{50}$ inch in diameter in the thin more permanently resupinate form, often running into each other so as to form parallel lines; sometimes so decurrent as to be entirely broken up.

518. DÆDALEA PAVONIA, *B. Hook. Lond. Journ.* 1847, p. 507; *Gardn.* (no 108).
On dead wood.

519. D. SUBSULCATA, *B. & Br.* Adnato-decurrens; pileo ochroleuco leviter zonato subtiliter tomentoso lævi; lamellis latis ligneis concoloribus demum dentatis (no. 567).

On dead wood. North Eliya, Dec. 1867.

Pileus nearly 4 inches across, sometimes laterally confluent, faintly but repeatedly zoned or grooved, clothed with minute matted pubescence.

520. HEXAGONA CRINIGERA, *Fr.* (No. 566.)
On dead wood. Damboul.

Pores $\frac{1}{9}$ of an inch across, hispid within, varying from umber to brown.

521. H. KŒNIGII, *B. Ann. Nat. Hist.* x. p. 379.
On dead wood. Dense forests base of Adam's Peak.

522. H. POLYGRAMMA, *Mont. Cub.* p. 379. (No. 365.)
On dead wood. Nuwara Eliya.

523. H. SIMILIS, *B. Lond. Journ.* 1846, p. 4. (No. 211.)

On dead wood.

Pores $\frac{1}{80}$, but in the Australian form $\frac{1}{48}$, after the fashion of *H. polygramma.*

524. H. DURISSIMA, *B. & Br.* Pileo ungulato rugoso brunneo rufoque zonato, contextu subcarneo, poris pallidis elongatis acie obtusis (no. 972).

On dead wood. Cent. prov., Dec. 1868.

Pileus 2 inches or more long; pores $\frac{1}{12}$ inch wide, $1\frac{1}{2}$ inch deep.

525. H. ADNATA, *B. & Br.* Tota adnata, contextu umbrino, poris latis dentatis decurrentibus subtiliter tomentosis (no. 610).

On dead wood. Damboul.

The specimens are in bad condition; but we have no species of which it can be a resupinate form.

526. H. PERGAMENEA, *B. & Br.* Resupinata, margine reflexo striato sublanato; poris mediis rigidis; contextu pallide fulvo.

On dead wood.

Some inches in length, about an inch wide, margin reflexed, striate, clothed with tawny spongy down.

527. FAVOLUS RUFICEPS, *B. & Br.* Pileo reniformi rufo fumoso scabro ciliato; stipite brevi; poris hexagonis concoloribus (no. 46 in part).

On decaying wood.

Pores $\frac{1}{18}$ inch across.

There is a form with a longer stem.

528. F. BRASILIENSIS, *Fr.* (No. 35 in part.)

On dead wood.

529. F. FRIESII, *B. & C. Journ. Linn. Soc.* x. p. 321.

On dead wood. Nov. 1867.

530. F. MULTIPLEX, *Lév. Ann. Sc. Nat.* 1844, ii. p. 203. (No. 35, cum icone.)

On dead wood. Peradeniya, Nov. 1867.

531. F. TESSELLATUS, *Mont. Syll.* p. 171. (No. 46, cum icone.)

On dead wood.

532. F. SCABER, *B. & Br.* Pileo ex albo fumoso, scabro; stipite brevissimo e disco orbiculari oriundo; poris alveolaribus acie laceratis tenuibus ochraceis (no. 618, 46 in part).

On dead wood. Tropical forests south of the island.

Pileus $2\frac{1}{2}$ inches across, pitted; pores $\frac{1}{24}$.

Resembles *F. tessellatus.*

533. LASCHIA CÆSPITOSA, *B.*, var. Pileo orbiculari convexo; stipitibus sæpe connatis gracilibus, centralibus glabris; poris irregularibus, dissepimentis tenuibus (no. 182, cum icone).

On decaying wood,=*Favolus manipularis*, B. Hook. Journ. 1854, p. 229.

Pileus $\frac{1}{2}$ inch across; stem 2 inches high, 1 line thick; pores $\frac{1}{40}$ wide when dry.

The Clarence-River plant is a little stouter, and the stem reddish.

534. L. PUSTULATA, *B. & Br.* Pileo ex ochraceo ferrugineo tuberculoso; stipite obliquo concolori e basi orbiculari oriundo; poris paucis amplis ochraceis (no. 396).

On dead wood. July, Aug. 1868.

Pileus orbicular, 2 lines across, ochraceous, then ferruginous, becoming viscous in drying, even when dried very rapidly, tuberculate; stem about 1 line high, ferruginous, arising from a little white orbicular base; pores few, ochraceous.

A very curious and distinct species.

535. L. THWAITESII, *B. & Br.* Cæspitosa; pileo tremelloideo, sæpe obliquo, lævi, aurantiaco; stipite gracili porisque albis (no. 183 cum icone, no. 188).

On dead wood, cæspitose and gregarious. Nov. 1867.

Pileus $\frac{1}{3}$ inch across, often oblique and slightly depressed; stem $\frac{3}{4}$ inch high.

536. MERULIUS SIMILIS, *B. & Br.* Late effusus, aurantiacus, margine albo; poris minoribus (no. 1032).

On dead wood. Peradeniya, Jan. 1869.

Effused for many inches, some lines thick; pores $\frac{1}{84}$ inch wide.

Closely resembling *M. lacrymans*, of which it seems to assume all the phases, but is permanently orange when dry.

537. M. VERSIFORMIS, *B. & Br.* Tenuis, primum pulverulentus granifurus ex ochraceo rufus, demum gelatinosus; hymenio vix poriformi (no. 660).

On dead wood. South of Island, July 1868.

At first forming a thin ochraceous pulverulent stratum, which is scattered with granules altogether after the fashion of *Grandinia*; but the hymenium gradually changes colour, and becomes of a gelatinous texture, with raised irregular processes, which hardly form pores.

538. HYDNUM (MESOPUS) THWAITESII, *B. & Br.* Pileo orbiculari lobato carnoso cinereo-lilacino stipiteque deorsum attenuato cavo tomentosis; spinis brevibus albis (no. 735 cum icone).

Peradeniya, Aug.–Dec., 1868; Neilgherries, *Capt. E. S. Berkeley.*

Pileus nearly 2 inches across, at first convex or conical, then expanded, with a broad obtuse umbo, lobed, fleshy, of a cinereous dingy lilac; stem 1½ inch high, ½ inch or more thick, attenuated downwards, covered with a short tomentum like the pileus, which is olivaceous when dry; spines about a line long, white; spores globose, tuberculated, ·00035 in diameter.

The plant turns black in drying.

539. H. (APUS) POLYMORPHUM, *B. & Br.* Cuneiforme, e mycelio communi effuso oriundum, postice radiato-rugosum umbrinum, antice farinaceum luteum marginatum; aculeis acutis quandoque furcatis farinosis vel subgelatinosis (no. 178).

Peradeniya, Nov. 1867.

At first spongy, 1½–2 inches long, sometimes conchiform, sometimes forming mere thick protuberances, covered on one side with prickles; hymenium yellowish, thin, rufous; mycelium resembling that of *Geaster mirabilis.*

A very singular species.

540. H. (APUS) OCHRACEUM, *P.* (No. 973.)

On sticks &c. Cent. prov., Dec. 1868.

541. H. (APUS) GLABRESCENS, *B. & Rav.* Dimidiatum, plus minus zonatum, e tomentoso glabrum umbrino-cervinum; spinis tenuibus acutis (no. 385).

On dead wood. Cent. prov., Dec. 1868.

542. H. (APUS) GILVUM, *B. Hook. Journ.* 1851, p. 168. Pileo flabelliformi ochraceo pilis cartilagineis radiantibus vestito; contextu fibroso spongioso, aculeis acutis (no. 980).

On dead wood. Cent. prov., Dec. 1868. Darjeeling.

Pileus 3 inches across, 2¼ long, flabelliform, clothed with radiating cartilaginous hairs; substance spongy mixed with cartilaginous bodies like those with which the pileus is clothed; prickles 2 inches long; spores ·0005–·0006 long, with a strong nucleus ·0002–·0003 wide.

Intermediate between *Hydnum* and *Hydnoglœa.*

543. H. (RESUPINATI) PRONUM, *B. & Br.* Album, crassum, decurrens, margine abrupto; aculeis conicis inter se adpressis, basi tomentosis (no. 975).

On dead wood. Cent. prov., Dec. 1868.

Running down the bark for many inches, after the manner of *Polyporus obliquus*, commencing in little round detached tomentose patches depressed in the centre, which gradually become warty, and at length develop the prickles, which are brown at the tip when perfect.

544. H. (RESUPINATI) VERSICOLOR, *B. & Br.* Recens nitide flavum,

margine elevato albo, mycelio albo lacunoso affixum ; aculeis elongatis subacutis siccis olivaceis (no 178, cum icone).

On dead wood. Peradeniya, July, Aug. 1868.

Five inches across ; substance spongy, white.

545. H. (Resupinati) ambiguum, *B. & Br.* Late effusum, ochroleucum, margine albo pulverulento ; aculeis minutis dense approximatis rimoso-congestis tomentosis (no. 974).

On dead wood.

Prickles so small as to be scarcely visible to the naked eye.

546. H. (Resupinati) hypochrum, *B. & Br.* Effusum, membranaceum, vix separabile, subiculo fulvo ; aculeis sparsis, sero elongatis acutis compressis (no. 600).

On dead wood. Dolosbagey, May 1868.

Spreading for several inches.

Above the tawny subiculum are delicate arachnoid threads, which are soon covered with a closer stratum as in *Corticium arachnoideum*.

547. H. (Resupinati) mucidum, *P.* (No. 382.)

On dead wood.

548. H. (Resupinati) membranaceum, *Bull.* (No. 386.)

On dead wood. Cent. prov.

549. H. (Resupinati) hypoleucum, *B. & Br.* Resupinatum, aculeis brevibus acutis ochraceis e strato niveo farinaceo tomentoso oriundis (no. 179).

On dead wood. Nov. 1867.

Prickles much longer than in *H. farinaceum*, white, not tan-coloured as in *H. alutaceum*.

550. H. (Resupinati) subvinosum, *B. & Br.* Tenue, margine tenuissimo pallido albo ; aculeis compressis subvinosis, apice candidis, quandoque confluentibus (no. 180).

On dead wood. Peradeniya.

Prickles compressed.

551. H. (Resupinati) farinaceum, *P.* (No. 387.)

On dead wood.

552. Irpex sinuosus, *Fr.*, var. cervicolor. (No. 77.)

On dead wood. Peradeniya, Nov. 1867.

It has very much the colour of *Hydnum glabrescens*.

553. I. zonatus, *B. Hook. Lond. Journ.* 1845, p. 168. (No. 384.)

On dead wood. Cent. prov.

A smaller form than that from Eastern Nepal and Sikkim.

554. I. VELLEREUS, *B. & Br.* Pileo dimidiato, lateraliter confluente, postice decurrente zonato, antice sordide candido spongioso; contextu sericeo; hymenio pallide vinoso-umbrino, margine striato obtusiusculo albicante; aculeis compressis confluentibus, apice candidis (no. 383).

On dead wood.

Many inches wide by confluence.

555. I. COLLICULOSUS, *B. & Br.* Totus resupinatus orbicularis, demum confluens convexus gilvus, margine tenui subbyssoideo pallido; aculeis compressis farinaceis (no. 366).

On dead wood.

Forming little elevated patches, which at length become confluent; hymenium sometimes persistently poriform, at first black-purple when moist.

556. I. FLAVUS, *Kl. Linn.* viii. p. 488. (No. 77 in part, 163, 222, 242.)

On bamboo, sticks &c. Peradeniya, south of the island, &c.

557. I. DEPAUPERATUS, *B. & Br.* Totus resupinatus, ex albo pallide ochraceus; subiculo primum arachnoideo, dein glabrato; aculeis compressis, apice partitis (no. 981).

On dead wood. Central province, Dec. 1868.

Completely resupinate; lower stratum at first finely arachnoid, then smooth, as in *Corticium arachnoideum*; prickles compressed, more or less divided above, arranged in short rows.

Allied to *I. candidus*, but a still more aberrant species.

558. RADULUM MIRABILE, *B. & Br.* Primum orbiculare tomentosum, demum confluens; hymenio perfecto hispidulo (no. 328).

On dead wood.

5 inches long, 2 broad.

559. GRANDINIA PAPULOSA, *B. & Br.* Effusa, ochroleuca, margine angustissimo vel obsoleto; hymenio glabro papulis obtusis depressis, interstitiis lævibus (no. 995).

On dead wood. Central province, Dec. 1868.

Spreading for some inches. Hymenium sprinkled with scattered depressed granules.

560. G. GRANULOSA, *Fr.*, var. CANDIDA. (No. 327.)

On dead wood.

561. G. LATERITIA, *B. & Br.* Effusa, lateritia, farinacea, granulis distinctis; margine, si adsit, pallidiore tomentoso (no. 334).

On dead wood.

Very much the colour of *Kneiffia fulva*, B. & C., a Cuban species; but the hymenium is very different.

562. KNEIFFIA INSULARIS, *B. & Br.* Tenuis, sparsa, irregularis, immarginata, lobata; hymenio centro subumbrino; granulis minutis (no. 660 in part).

On dead wood. Peradeniya, Aug. 1868. With *K. Mülleri.*

There is also what we suppose to be a younger state, in which the plant is white with a pinkish-grey tinge in the centre.

563. K. MÜLLERI, *B. Journ. Linn. Soc.* xiii. p. 167. (No. 660 in part.)

On dead wood. South of the island, July 1868.

This very curious species is at once distinguished by the granules falling out and leaving little holes. The Ceylon specimens seem the same with those from Australia, but are of a purer white.

564. K. DISCOLOR, *B. & Br.* Tenuis, submembranacea, lobata, margine angustissimo, lactea, granulis rufis (no. 982).

On dead sticks. Central province, Dec. 1868.

Spread over the bark. The edge sometimes free.

565. K. SETIGERA, *Fr.* (No. 654.)

On dead wood, &c. South of the island, July 1868.

566. K. ISABELLINA, *B. & Br.* Tenuis, late effusa, margine tenuissimo pulverulento quandoque elevato; hymenio isabellino, granulis minutissimis (no. 655).

On dead wood. South of the island, July 1868; central province, Dec. 1868.

Spreading far and wide; surface continuous, of a delicate pinkish grey, covered with extremely minute granules.

567. K. CHROMO-PLUMBEA, *B. & Br.* Luteo-fulva, margine tenui pulverulento byssoideo flavo; hymenio granulato, setulis albis (no. 606).

On bark. Dolosbagey, May 1868.

Varying from chrome-yellow to tawny.

In one specimen, if really the same, the margin is white. It appears to turn brown when old.

568. K. CORIACEA, *B. & Br.* Crassa, rigida, secernibilis, hymenio pallide umbrino granulis albis sparso, margine lato fusco (no. 991).

On dead wood. Central province, Jan. 1869.

4 inches across; margin barren.

569. K. GELATINOSA, *B. & C. Linn. Soc. Journ.* x. p. 327. (No. 602.)

On bark. Central province.

Not quite so thick as the Cuban specimens, but clearly the same species.

570. CLADODERRIS DENDRITICA, *P.* (No. 614.)
On dead wood. Tropical forests in the south of the island, July 1868.

No. 279 is a paler form, and apparently *C. membranacea*, De Vries and Léveillé.

571. C. THWAITESII, *B. & Br.* Minor, erecta, spathulata, extus glabrescens; stipite subcylindrico compresso radicante (no. 1003).
Peradeniya, Nov. 1868.
About 2 inches high with the stem, $1\frac{1}{4}$ across at the top, becoming dark brown above; hymenium pale rufous, distinctly veined.

572. THELEPHORA CRISTATELLA, *B. & Br.* Pusilla, nivea, cuneiformis, deorsum tomentosa, sursum acute cristato-divisa (no. 1021).
Peradeniya, Dec. 1868. Whole plant $\frac{1}{2}$ an inch, wedge-shaped, tomentose below, above divided in a crest-like manner into a few very acute radiating divisions.

573. T. DENTOSA, *B. & C. Journ. Linn. Soc.* x. p. 329. (No. 343.)
On rotten wood &c.

Exactly the Cuban plant.

574. T. PEDICELLATA, *Schwein. Syn.* p. 108. (No. 342.)
On bark. South of the island, July 1868.

575. T. SUFFULTA, *B. & Br.* Hymenio umbrino, pilis brunneis primum circinantibus suffulto (no. 669).
On bark. South of the island, 1868.

Nearly allied to *T. pedicellata*; but the supporting bristles are coarser, inclined to rufous, and rise in rings, so as to call to mind *Peziza scutellata*. The same species was sent by Gardner on living shrubs from Rumboda, Jan. 1847, but with the supporting hairs scattered.

576. T. DICTYODES, *B. & Br.* Subiculo fasciculato-tomentoso; hymenio reticulato cinereo, sero continuo (no. 1027).
Central province, Dec. 1868.
The subiculum consists of little erect tomentose fascicles, on the tips of which the hymenium is developed, so as at first to form a network, and then by confluence more or less effused.

Allied to the last two, but with a very different subiculum.

577. T. CAPNODES, *B. & Br.* Effusa, ambiens, subiculo parco rubiginoso; hymenio tenui fuliginoso (no. 547).
On sticks. Central province, Feb. 1868.

Differs from *T. arachnoidea* in the different colour of the subiculum and hymenium.

578. T. LICHENICOLA, *B. & Br.* Subiculo rufo furfuraceo-floccoso; hymenio pallide umbrino margine albo (no. 1026).

On lichens and bark. Peradeniya, Dec. 1868.

Distinguished from its near allies by the different nature of the subiculum and the more highly developed hymenium.

579. T. FLORIDEA, *B. & Br.* Resupinata, tenuis, atropurpurea, subtiliter tomentosa, margine pallidiore vel obsoleto (no. 336).

On dead wood.

Perhaps rather a congener of *Stereum papyrinum.*

580. T. ATROPURPURASCENS, *B. & Br.* Effusa, hymenio granulato-rugoso atropurpureo marginem versus album breviter fimbriatum rubescente (no. 989).

Central province, Jan. 1869.

Forming elongated patches about ¾ inch wide, rough, with irregular raised nodules, in the centre vinous brown, more red towards the white margin.

No. 541 forms ferruginous patches traversed by matted fibrils; but without any hymenium it cannot be referred to the proper genus.

581. T. ARACHNOIDEA, *B. & Br.* Subiculo molli nigro; hymenio pulverulento cinereo (no. 539).

Habgalla, Feb. 1868.

This bears almost the same relation to *Thelephora* that *C. arachnoideum* does to *Corticium.* It is a close ally of *T. capnodes.*

582. T. SUBCARBONACEA, *B. & Br.* Subiculo parco molli nigro, floccis arachnoideis percurso; hymenio pallido (no. 538).

Peradeniya, Feb. 1868.

Closely allied to the last.

583. T. THWAITESII, *B. & Br.* Resupinata, tenuis, frustulosa, coffeicolor, margine tenuissimo elevato; hymenio subtiliter pulverulento-tomentoso; subtus lætius colorata tomentosa (no. 325).

On sticks.

Allied to *T. pedicellata.*

584. T. SUBMEMBRANACEA, *B. & Br.* Late effusa, secernibilis, hymenio fulvo-umbrino e sporis pulverulento (no. 987).

Central province, Jan. 1869.

Spores tawny, oblique, ·00028 long.

585. T. ACCUMBENS, *B. & Br.* Orbicularis, subimbricata, mollis, umbrina, margine albicante.

Trunks of trees. Hautani, Nov. 1859. 3000 feet.

Consisting of a number of patches which crowd one upon another, at first making little pulvinate tufts. The hymenium is only partially developed, but is rugose and browner than the subiculum.

Nos. 544, 546 are clearly imperfect states of this or some allied species.

586. STEREUM (MESOPUS) NITIDULUM, *B. Hook. Lond. Journ.* 1843, p. 638.

Peradeniya, Nov. 1867.

A large form, possibly distinct; more fasciculate in its mode of growth, more divided and marked, with little raised lines. The normal form was collected in Ceylon by Gardner.

587. S. (MESOPUS) ELEGANS, *Fr.* (No. 682.)

On dead wood. South of the island, July 1868.

588. S. (MESOPUS) PARTITUM, *B. & Br.* Pileo ex infundibuliformi fisso brunneo lineato; stipite brevissimo obsoleto; hymenio pallidiore rimoso (no. 681).

On dead wood. South of the island, July 1868.

About 1½ inch high and broad, infundibuliform, soon variously split almost to the very short stem, which is hispid when present.

Allied to *S. fissum.*

589. S. (MESOPUS) TUBA, *B. & Br.* Gregarium, ex infundibuliformi flabellatum, tenerum, pallide rufum, in stipitem tenuem brevem angustatum (no. 625).

Tropical forests. South of the island.

Gregarious, sometimes fasciculate, $\frac{1}{3}$–$\frac{1}{2}$ inch high, tender, infundibuliform, then splitting on one side so as to become flabelliform, pallid, rufous, darker when old; hymenium finely striate.

590. S. LOBATUM, *Fr.* (no. 404); *Gardn.* (no. 102).

On dead wood.

591. S. RIMOSUM, *B. Hook. Kew Journ.* 1851, p. 169. (No. 338.)

Habgalla.

592. S. PERCOME, *B. & Br.* E resupinato reflexum, papyraceum; pileo zonato spongioso hispido; margine tenuissimo; hymenio concentrice sulcato cervino-rufo (no. 983).

On dead wood. Central province.

Spreading for several inches, at first orbicular, with a delicate white margin, sulcate when little more than $\frac{1}{3}$ inch across, soon confluent and forming a broad continuous sheet; hymenium of a bright fawn-brown.

593. S. papyrinum, *Mont. Cub.* p. 374. (Nos. 220, 740, 257, 536, 544.)

On dead wood. Peradeniya, Aug. Dec. 1868; Habgalla, Jan. 1868.

Varying in brightness of colour.

594. S. albo-cinctum, *B. & Br.* Totum resupinatum lobatum crassiusculum; hymenio lævi glabro isabellino, albo-marginato; contextu ferrugineo (no. 661).

On dead wood. South of the island, July 1868.

Spreading for 3 inches or more; hymenium of a delicate fawn-colour, margin pure white.

595. S. endoleucum, *B. & Br.* Totum resupinatum effusum crassiusculum, margine obtuso elevato, contextu niveo; hymenio ochroleuco subtiliter pubescente (no. 966).

On dead wood. Central province.

Spreading for some inches in length, 1¼ broad.

596. S. insulare, *B. & Br.* Irregulare fusco-limitatum, pallide umbrinum; hymenio glabro rivuloso (no. 662).

On smooth bark. South of the island, July 1868.

Forming little detached irregular patches ¼–⅓ inch across, rather raised above the surface of the matrix, and limited by a dark line.

597. S. notatum, *B. & Br.* Effusum, margine tomentoso pallido libero; hymenio hic illic concentrice notato pallido (no. 988).

On dead bark. Central province, Jan. 1869.

Spreading for several inches. At first looking like a little *Cyphella*; but the individuals soon become confluent; hymenium marked with concentric rings; edge thin, papyraceous.

598. S. subpurpurascens, *B. & Br.* Rigidum coriaceum sulcato-zonatum ferrugineum tomentosum; hymenio atropurpureo; contextu rufo.

On dead wood.

About 6 inches wide, 2½ long, of a rigid coriaceous substance, repeatedly zoned and sulcate, variegated with brown and umber, the ridges tomentose, with little radiating prominences; hymenium with a velvety aspect, from very minute brown bristles.

A large species with somewhat of the aspect of *S. princeps*.

No. 979, Central Province, Dec. 1868, is a small form of the same species.

599. S. duriusculum, *B. & Br.* Effusum immarginatum intus stratoso-lineatum; hymenio lævissimo ochraceo glabro (nos. 329, 560).

On dead wood. Kandy, 1868.

Forming continuous patches which ultimately break up from the matrix, tolerably thick, hard, marked with several lines of growth.

600. S. ANNOSUM, *B. & Br.* Crassum durissimum, intus rufum stratoso-zonatum; hymenio pallide umbrino, dein rimoso irregulari, margine subelevato (no. 659).

On dead wood. South of the island. Central province, July, Nov. 1868. Neilgherries, *Capt. E. S. Berkeley.*

Clearly of several years' growth, a new hymenium being formed each season, apparently each year becoming narrower. Allied to *S. frustulosum.*

601. S. RUBERRIMUM, *B. & Br.* Pulvinatum; hymenio pulchre rubro in basi nigra insidente; margine angustissimo albo (nos. 323, 462, 993).

On lichens and their apothecia. Habgalla, Feb. 1868; central province, Dec. 1868, *Capt. E. S. Berkeley.*

About 2 lines across; probably, like the last, of some years' growth.

602. S. SULFUREUM, *Fr.* (No. 437.)

On dead wood. Habgalla, Dec.

603. S. ACERINUM, *Fr.* (No. 999.)

On dead wood. Central province, Dec. 1868.

604. S. LEPRA, *B. & Br.* Candidum tenue adnatum, primum orbiculare, demum confluens; hymenio rimuloso (no. 330).

On bark.

Resembling *S. acerinum*, but far thinner and more inclined to separate from the matrix.

605. LACHNOCLADIUM RAMEALE, *B. & Br.* Atropurpureum filiforme furcatum, apicibus acutis, basi setis tenuibus mixtum; mycelio tenuissimo albo (no. 595).

On living branches; running up the petioles of the leaves, and sometimes on the leaves themselves. Ambagamowa, Sept. 1862.

606. L. FURCELLATUM, *Lév.* (No. 50.)

Peradeniya, Nov. 1867.

The tips of the threads composing the hymenium are widely forked.

No. 531, Damboul, is a form of the same species, and no. 1005 a variety more elongated and at length brown.

607. HYMENOCHÆTE TENUISSIMA, *B.*—Stereum tenuissimum, *Hook. Lond. Journ.* 1847, p. 510. (Nos. 10, 534.)

On dead wood, sticks, &c. Habgalla, Dec. 1867.

608. H. RIGIDULA, *B. & C. Journ. Linn. Soc.* vol. x. p. 334. (No. 978.)

On dead wood. Central province, 1868.

609. H. CROCATA, *Lev.*—Thelephora crocata *Fr.*

On dead wood. 1850.

610. H. STRIGOSA, *B. & Br.* Dimidiata, postice decurrens, tenuis, eximie lobata zonata, spadicea, strigosa; hymenio coffeato (no. 977).
On dead wood. Central province, Nov. 1868.
Pileus $2\frac{1}{4}$ inches across, of a rich brown, repeatedly lobed and zoned, clothed with strigæ and subjacent tomentum; hymenium deep coffee-brown.

611. H. RAMEALIS, *B.* Ambiens, coffeicolor, confluens, margine late reflexo, extus zonata strigosa.
On branches of living shrubs. Nuwara Eliya, Jan. 1847.
Running down the stems for several inches; margin on either side broadly reflexed.

612. H. SPADICEA, *B. & Br.* Pileo dimidiato vel suborbiculari, postice affixo, zonato strigoso, e ferrugineo spadiceo; hymenio lineato rugoso (no. 534 in part).
On dead wood.
Pileus $1\frac{1}{2}$ inch across, $\frac{3}{4}$ long.
Approximating in colour to *H. Cacao*.

613. H. DURA, *B. & C. Journ. Linn. Soc.* x. p. 334. (No. 546.)
Peradeniya, Dec. 1869.
A little less bright in colour than the Cuban specimens.

614. H. LEONINA, *B. & C. l. c.* (No. 335.)
On dead wood.

615. H. CROCICREAS, *B. & Br.* Crassa, resupinata, intus croceo-lateritia, matricem eodem colore tingens (no. 658).
On decayed wood.

616. H. DEPALLENS, *B. & C.* Resupinata ambiens pallide fulva lævis, contextu molli fulvo, margine quandoque brevi byssoideo (no. 145).
On small dead branches. Central province, Nov. Dec.
Moderately thick; when on a flat surface, surrounded by a narrow byssoid border.

617. H. CORRUGATA, *Lév.*—Thelephora corrugata *auct.* (No. 145 in part).
Peradeniya, 1868.

618. H. PELLICULA, *B. & Br.* Resupinata, effusa, tenuissima, a matrice hic illic secernibilis, rubiginoso-grisea, margine vix ullo vel tenerrimo (no. 990).
On Bamboo.
Forming a thin continuous membrane of a peculiar rubiginous grey tint.

619. H. FLORIDEA, *B. & Br.* Resupinata immarginata tenuissima purpureo-rubiginosa (no. 336).
On dead wood. Central province.

620. H. DENDROIDEA, *B. & C.* Tota resupinata, costis dendroideo-radiata, sursum dentato-fimbriata (no. 266).
On dead wood. Central province, Dec. 1868.

Not so highly developed as Venezuela specimens, which remind one of some flabelliform coralline on a small scale.

621. H. FULIGINOSA, *Lév. Ann. Sc. Nat.* Feb. 1846 (no. 219).
On dead wood.

622. DICTYONEMA SERICEUM, *Mont. Bél. Voy.* p. 155 (sub *Dichonemate*).—Thelephora sericea, *Sw.*
Ratnapoora, 1870.

623. CORTICIUM LÆVE, *Fr.* (Nos. 329, 331.)
On dead wood. Central province, Dec. 1868; no. 607, Dolosbagey, May 1868; no. 331 is a form with a slight pinkish tint.

624. C. MOUGEOTII, *Fr.*
On dead wood. Also from E. Nepal.

625. C. INCARNATUM, *Fr.* (No. 986.)
On some byssoid *Sphæria*. Central province, Dec. 1868.

626. C. MODESTUM, *B. & Br.* Orbiculare, demum confluendo lobatum, contextu pallido subluteo, margine breviter byssoideo; hymenio luteo-griseo glabro (no. 992).
On dead wood. Central province, Dec. 1868.
Forming very thin patches $\frac{1}{2}$–$1\frac{1}{2}$ inch across, of a yellowish grey, with a short yellowish border, which is sometimes partially detached; hymenium occasionally slightly zoned concentrically.

627. C. RHABARBARINUM, *B. & Br.* Effusum; hymenio pulverulento rhabarbarino e fibris radiantibus ramosis byssoideis oriundo, demum glabrato rimoso; contextu rubiginoso; margine angusto pallido evanido (no. 657).
On dead wood. South of the island, July 1868.
Extending for several inches, springing from radiating byssoid fibres; new plants springing from the first-formed hymenium, in the following season becoming smooth, rigid, and much cracked.

628. C. RETICULATUM, *B. & Br.* Hymenio pulverulento rhabarbarino in pulvinulos fracto, e floccis byssoideis flavis oriundo (no. 656).
On dead wood. South of the island, July 1868.

Undoubtedly closely allied to the last; but the primary threads are of a different colour, and the hymenium from the first is dispersed or broken up into little tufts, which give it somewhat the aspect of *Trichia reticulata*.

629. C. PERADENIÆ, *B. & Br.* Suborbiculare vel irregulariter pezizæ-

forme, margine elevato albo pulverulento tomentoso; hymenio ochraceo-carneo vel salmonicolori pulveraceo-setaceo (no. 199).

On dead wood.

About $\frac{1}{2}$ an inch wide; it loses its colour after being kept in the herbarium.

A most lovely species; in habit resembling *C. Oakesii.*

630. C. CHLORASCENS, *B. & Br.* Effusum subsecernibile, contextu margineque obtusiusculo lobato albis; hymenio pallide virente (no. 984).

On dead wood. Central province, Dec. 1868.

631. C. ALOPECINUM, *B. & Br.* Cervinum secernibile membranaceum; contextu molli fibroso fulvo; hymenio pulverulento (no. 1034).

On dead wood. Central province, Jan. 1869.

Spreading for several inches, soft and pliable, looking like a piece of very thin shrivelled leather.

632. C. EMPLASTRUM, *B. & Br.* Effusum tenue, substrato niveo marginem angustum efformante; hymenio glaberrimo alutaceo rimoso (no. 985).

On dead wood. Central province, Dec. 1868.

Forming little confluent patches about half an inch wide; margin very narrow, byssoid; the whole looking like a little plaister.

It comes near to *C. ceraceum,* B. & Br.; but that is not the least cracked, and is thicker.

633. C. PEROXYDATUM, *B. & Br.* Resupinatum, immarginatum, inæquabile, læve, subtiliter pulverulentum, martianum, intus cinnabarinum (no. 270).

Sunk into the wood.

634. C. LILACINUM, *B. & Br.* Effusum, e lilacino pallescens, margine albo tomentoso; hymenio demum rimoso (no. 997).

On charred wood. Central province, Dec. 1868.

Forming elongated patches an inch or more in breadth; hymenium in general quite even, but sometimes slightly tuberculated, cracking in drying, and exposing the white substance.

635. C. MURINUM, *B. & Br.* Effusum, demum frustulosum, murinum, immarginatum, subtiliter pruinosum, subtus fuscum (no. 32).

On mosses.

Spreading for some inches over bark; at first almost arachnoid.

Peradeniya, Dec. 1868.

In very young specimens there is sometimes a very indistinct white border, from the hymenium not being yet perfectly formed.

636. C. TRISTICULUM, *B. & Br.* Fuligineum effusum atro-marginatum, substrato tomentoso; hymenio lævissimo (no. 994).
On dead twigs. Central province, Dec. 1868.

Resembling somewhat *C. cinereum*; edge, before covered with the hymenium, rather brighter in colour.

637. C. TENUISSIMUM, *B. & Br.* Suborbiculare tenuissimum subglaucum, margine albo annulo rufo cincto (no. 998).
On dead bark. Central province, Dec. 1868.
Extremely thin, smooth, 1–3 lines broad.

638. C. MUSCIGENUM, *B. & Br.* Primum tenue margine albo tomentoso, demum incrassatum margine elevato; contextu molli albo; hymenio isabellino (no. 549).
Running over mosses. Habgalla, Feb. 1868.

Allied to *C. Peradeniæ* and *scariosa*; hymenium extremely smooth. Looks like a mass of plaister which had fallen on the moss. It differs from *C. Habgallæ* in the smooth hymenium.

639. C. SCARIOSUM, *B. & Br.* Ochroleucum scariosum, hymenio glabro e mycelio arachnoideo oriundo, demum subsecernibile (no. 548).
On dead wood. Habgalla, Feb. 1868.
Forming thin patches which at first consist of arachnoid fibres, which after a time are partially collected together and run over the first in the form of thin threads.

Though somewhat resembling *C. Peradeniæ* and *salmonicolor*, there is a material difference.

640. C. SALMONICOLOR, *B. & Br.* Effusum carneo-roseum subtiliter pulverulentum, demum rimoso-areolatum, e mycelio tenerrimo albo oriundum (no. 4).
On dead wood.
Spores much smaller, and not so oblique as in *C. Peradeniæ*.

Allied to *C. roseum*.

641. C. HYPOCHNOIDEUM, *B. & C.* Pusillum stellato-orbiculare rubrum, margine elevato; hymenio demum atro-vinoso (no. 632).
On dead wood. Tropical forests of the south of the island, July 1868.
Sometimes erumpent, sometimes superficial, with a narrow white border.

Analogous to *Stereum ruberrimum*.

642. C. CÆRULEUM, *Fr.* (No. 268.)
On dead wood, which is stained with it. Nuwara Eliya.

643. C. GIGANTEUM, *Fr.* (No. 337.)
On charred wood. Nuwara Eliya.

644. C. CALCEUM, *Fr.* (No. 329 in part.)

On dead wood.

645. C. HABGALLÆ, *B. & Br.* Suborbiculare ceraceum ochroleucum, margine tenui tomentoso uno latere elevato; hymenio subtiliter setuloso (no. 339).

On dead bark. Habgalla.

646. C. SIMULANS, *B. & Br.* Molle, fulvum, e strato albo floccoso membranaceo oriundum; hymenio lævissimo (no. 340).

Running over mosses.

At first sight resembling *Merulius Corium.* Spores subelliptic, ·0003 long.

647. C. FLAVO-RUBENS, *B. & Br.* Sparsum irregulare sulfureum, centro demum rubens pulveraceum (no. 437).

From 2–3 lines across.

648. C. APALUM, *B. & Br.* Resupinatum, margine angustissimo candido; hymenio subtiliter setuloso isabellino (no. 332).

On bark. Central province, Dec. 1868.

When young determinate, with a narrow white border, but soon spreading for several inches and less determinate, acquiring a deeper, almost gilvous, tinge; substance rust-coloured. Spores fusiform, ·0003 inch long, ·00014 inch broad.

Nearly allied to *C. Habgallæ.*

649. C. AMBIENS, *B. & Br.* Contextu niveo; hymenio candido glaberrimo continuo; margine tenuissimo agglutinato (no. 607).

On dead branches. Central province, Dec. 1868.

Spreading for several inches, extremely smooth, scarcely at all cracked; substance rather rigid, moderately thick, white; margin, when present, consisting of very delicate threads glued to the matrix.

650. C. SPARSUM, *B. & Br.* Candidum suborbiculare sparsum immarginatum; hymenio setuloso (no. 976).

On bark.

Forming little patches about a line wide, white, beautifully and distinctly setulose.

651. C. SUFFULTUM, *B. & Br.* Album; hymenio molli tomentoso processibus niveis floccosis suffulto (no. 551).

On dead twigs. Central province, Feb. 1868.

Surrounding the twigs without any definite margin. Analogous to *Thelephora pedicellata.* Hymenium growing on the top of little erect processes.

652. C. COMEDENS, *Fr.* (No. 623.)

On dead sticks. Tropical forest, south of the island, July 1868.

Bursting out from the bark like the typical form, but presenting nothing more than a very thin pulverulent hymenium.

No. 631, from the same locality, Feb. 1868, differs in being of a purer white.

Artocreas, *B. & Br.*

Receptaculum commune distinctum; hymenium planum e sporis magnis pulveraceum.

653. Artocreas poroniæforme, *B. & Br.* Erumpens; receptaculo hemisphærico, pallide rufo; hymenio albido; sporis globosis (no. 309).

On bark.

Looking just like an imperfect *Crucibulum*. Spores globose, ·0009 in diameter. A species of the same very distinct genus occurs in the United States.

A. Micheneri, *B. & C.* Extus album tomentosum; hymenio rufo; sporis ovatis apiculatis pedicellatis (nos. 3529, 3773).

Pennsylvania, *Michener*.

About ¼ of an inch wide, or more by confluence; spores ovate, with a long obtuse apiculus, ·0013 long without the apiculus.

654. Guepinia spathularia, *Fr.* (Nos. 353, 586.)

On dead wood.

655. G. cochleata, *B. & Br.* Cæspitosa; pileo spathulato melleo, deorsum in stipitem pubescentem ochraceum angustato; hymenio parce rugoso-costato (no. 586 in part).

On dead wood. Dolosbagey, May 1868.

About 1 inch high, ½ an inch or more broad.

A larger species than the last.

656. G. fissa, *B. Ann. Nat. Hist.* vol. x. p. 383.

On dead wood. Central province, Dec. 1868.

657. G. palmiceps, *B. l. c.*

On dead wood.

658. Auricularia lobata, *Sommf.* (No. 319.)

On dead wood. Habgalla.

659. Cyphella versicolor, *B. & Br.* Sessilis irregularis, margine inflexo extus tomentoso; hymenio fulvo e strato fulvo tomentoso oriundo (no. 105).

On dead wood. Nov. 1867.

Spores ·0004 inch long, pale brown.

Looks like a *Tapesia*.

660. C. SPERMOIDES, *B. & Br.* Gregaria minuta pallida, extus tomentosa; hymenio cervino; sporis ovatis (no. 578).
On dead wood. Dolosbagey, 3000 feet, May 1868.

Scattered about like the eggs of some insect.

661. C. DISSEMINATA, *B. & Br.* Cupulis sessilibus obovatis ore parvo apertis, extus floccis melleis granulatis vestitis (no. 125).
On decayed bark. Peradeniya, Nov. 1867.

Looks at first like a *Nectria.* No. 138 appears to be a conidiiferous state of some *Nectria.*

662. C. VILLOSA, *B. & Br.*—Peziza villosa, *P.* (Nos. 226, 229, 561.)
On dead twigs &c.

663. C. EPILEUCA, *B. & Br.* Alutacea, pruinosa, pileo galeato e mycelio tenui albo oriundo; hymenio lævi, sporis binucleatis (no. 98). No. 99 a little darker.

664. C. PRUINOSA, *B. & Br.* Minuta, cupulæformis, extus pruinosa; hymenio cervino (no. 81).
On dead wood.
Hymenium brown when dry; hairs granulated; spores ·000$\dot{2}$ long.

665. C. PULCHRA, *B. & Br.* Cupuliformis cremoricolor, e strato candido byssoideo oriunda, margine lacerato; hymenio pallide flavo (no. 368).
On bark.

666. C. PARASITICA, *B. & Br.* Minuta cupuliformis nivea, extus villosa, margine inflexo; sporis ovatis obliquis (no. 1000).
Parasitic on some *Sphæria.*

Allied to *C. villosa.* Spores ·00025–·0003 long.

667. C. RETICULATA, *B. & Br.* Pallida brevis erecta vel decumbens massam reticulatam polyporoideam simulans (nos. 265, 958).
On dead wood.

668. SOLENIA CANDIDA, *Hoffm.* (Nos. 149, 276, 277.)
On dead wood.

669. S. FASCICULATA, *P.* (No. 277 in part.)
On dead wood.

670. S. VILLOSA, *Fr.* (No. 1023.)
On dead wood. Peradeniya, Dec. 1868.

671. S. HYDNOIDES, *B. & Br.* Effusa imbricata cylindrica, e mycelio molli oriunda (no. 149 in part).
On dead wood. Peradeniya, Dec. 1868.

Looking at first very like *Hydnum ochraceum*, but a true *Solenia*, and certainly not *S. fasciculata.*

672. S. OCHRACEA, *Hoffm.* (No. 278.)
On dead sticks &c.

673. CLAVARIA FORMOSA, *Fr.* (No. 552; no. 676 in part.)
On the ground. South of island, July 1868; central province, Dec. 1868.

Lachnocladium Hookeri, B., appears to be the same species.

674. CLAVARIA THWAITESII, *B. & Br.* Trunco crasso, ramis pluries divisis apicibus fuscis; sporis subglobosis (no. 552).
On the ground. Central province, Dec. 1868; Damboul, March 1868.

Exactly the form of *Clavaria formosa*; but the spores in that species are broadly fusiform and granulated. No. 676 is a variety with the divisions more as in *C. stricta*. Spores subglobose, even, with a large nucleus, ·00035 in diameter. Under the same number from the south of the island, July 1868, is a still more strongly divided form, with a narrow stem, but the spores exactly the same.

675. C. MEGALORHIZA, *B. & Br.* Ochracea multifida e mycelio radiciformi oriunda, apicibus acutis ut plurimum penicillatis; sporis ochraceis (no. 197).
On wood. Central province, Dec. 1868.
About 1½ inch high.

676. C. ECHINOSPORA, *B. & Br.* Repetiter furcato-ramosa, a mycelio stipitiformi oriunda, sicca nigra, sporis ellipticis echinulatis.
Peradeniya, July 1868.

Undoubtedly nearly allied to the last; but the spores are larger, and the whole plant becomes black when dry.

No. 677 (Peradeniya, July 1868) seems, however, to be a variety of *C. megalorhiza*, which becomes darker in drying. Spores broadly elliptic, strongly echinulate, ·0002–·00025 long, ·0001–·00015 broad.

677. C. SEMIVESTITA, *B. & Br.* Fasciculata ochracea, ramis cylindricis furcatis, e trunco tenui oriundis, deorsum tomentosa; apicibus acutis (no. 677 in part).
On the ground.
About 1 inch high. Half the plant is covered with short down.

678. C. STRICTA, *P.* (No. 1005.)
On wood. Central province, Dec. 1868.

679. C. BYSSISEDA, *P.* (No. 1004.)
On dead wood. Central province, Dec. 1868.

680. C. CHLORINA, *B. & Br.* Simplex vel subramosa rugosa viridis, stipite tenui (no. 200).

On the ground amongst leaves, Nov. 1867.

Sometimes forked or proliferous. Spores ·00015 long, setulose.

681. C. ARGILLACEA, *Fr.* (No. 67.)

On the ground. Nov. 1867.

682. C. INÆQUALIS, *Fr.* (No. 67 in part.)

On the ground.

Exactly the form figured by Greville. Spores ·00015.

683. C. MINIATA, *B. Hook. Lond. Journ.* 1843, p. 416.

On the ground, *Gardner*.

684. C. XYLOGENA, *B. & Br.* Simplex, pusilla, albida, acutissima, pulverulenta, e communi basi fasciculatim oriunda (no. 675).

On dead wood. Peradeniya, July 1868.

Dispersed in little scattered fascicles, or more rarely single, $\frac{1}{4}$ inch high. Spores elliptico-subfusiform, ·0005 long, ·0002 wide.

685. C. LÆTA, *B. & Br.* Simplex fasciculata acuta nitide rubra (no. 679 cum icone).

On red soil which is bound together by delicate mycelium. Peradeniya, July 1868.

About 3 inches high, resembling *C. inæqualis,* but not at all swollen, gradually attenuated above, and narrow below, without any distinct stem; spores nearly globose, ·0003 in diameter.

686. C. FUSIFORMIS, *Sow.* (Nos. 678, 680 cum icone.)

On the ground. Peradeniya, July 1868.

Rather irregular in form; but Fries himself says "variat inæqualis."

687. C. JUNCEA, *Fr.* (No. 1002.)

Amongst leaves &c. Peradeniya, Dec. 1868.

688. CALOCERA STRICTA, *Fr.* (No. 572.)

On dead wood &c. Dolosbagey.

689. HIRNEOLA HISPIDULA, *B. Ann. Nat. Hist.* iii. p. 396. (No. 189.)

On dead wood. Nov. 1869.

690. TREMELLA FUCIFORMIS, *B. Hook. Journ.* 1856, p. 277. (Nos. 397, 668.)

On dead wood, Peradeniya. South of the island, July 1869.

691. T. MORIFORMIS, *Sm.* (No. 726.)

On dead orange-twigs. Peradeniya, Aug. 1868.

692. T. INDURATA, *B. & Br.* Cerebriformis tuberculata indurata ferruginea, sicca nigra.
Rumbodæ, *Gardner*. Jan. 1847.

Does not tinge the water.

693. T. FERRUGINEA, *Sm.* (No. 322.)
On dead wood, Nuwara Eliya, 7000 feet, Dec. 1867.

694. T. VERSICOLOR, *B. & Br. Ann. Nat. Hist.* ser. 2, vol. xiii. p. 406. (No. 1017.)
On *Corticium*. Peradeniya, Dec. 1868.

695. T. SCUTELLÆFORMIS, *B. & Br.* Parva scutellæformis, ex albido fuscescens, puncto centrali affixa (no. 1020.)
On wood. Central province, Jan. 1869.
About a line broad, at length confluent.

696. NEMATELIA GUTTÆFORMIS, *B. & Br.* Pusilla congregata guttæformis rufa, nucleo pallido, confluendo lobata (no. 667).
On dead wood. South of the island, July 1868.
About a line broad.

697. DACRYMYCES FURCIFER, *B. & Br.* Luteus, subglobosus; contextu ramulis ultimis furcatis acuminatis, demum articulatis (no. 352).
On dead wood.

The ramification of the constituent threads reminds one, when perfect, of *Chætophora*.

GASTEROMYCETES.

698. DICTYOPHORA DÆMONUM, *Lév.*—Phallus Dæmonum, *Rumpf.*, *Gardn.* no. 14.
On the ground in shady places. Peradeniya, 1853; *Dr. Harvey*, 1853.

699. CLATHRUS DELICATUS, *B. & Br.* Minuta; reticulo parco delicato; sporis in glomerulos hic illic sitis (no. 784 cum icone).
On rotten cocoa-nut trunks &c. Peradeniya, Nov. 1868.
Whole plant scarcely ½ an inch high; volva brown; net-work pale; hymenium confined to certain points, so that the spores appear to be collected into little scattered heaps.

700. C. CANCELLATUS, *L.*, *Gardn.* (No. 55 cum icone.)
In shady forests, July 1844.

701. ASEROE ZEYLANICA, *B. Hook. Lond. Journ.* 1847, p. 512; *Gardn.* (No. 91 cum icone.)
On the ground, 4000–5000 feet, 1867, *Gardner, Thwaites.*

702. SIMBLUM GRACILE, *B. l. c.*; *Gardn.* (No. 80 cum icone.)
On the ground in open places. Aug. 1844, *Gardner*, 1854, *Thwaites.*

703. Lysurus Gardneri, *B. l. c.*; *Gardn.* (no. 62); *Thwaites* (no. 736).
On the ground in damp shady places. Peradeniya, July 1868.

704. Mitremyces lutescens, *Schwein.* (No. 673.)
On the ground. South of the island, July 1868.

705. Husseia insignis, *B. l. c.* p. 508. (No. 672.)
On the ground. Adam's Peak, *Gardner*. Central province, Dec. 1868; south of the island, July 1868.

706. Geaster Bryantii, *B.* (No. 1007 cum icone.)
On the ground. Peradeniya, Nov. 1868.
Spores globose, echinulate, ·0002–·00025 in diameter.

707. G. saccatus, *Fr.* (No. 184.)
On the ground. Peradeniya, July–Dec.
Spores globose, even, ·0002 in diameter.

708. G. minimus, *Schwein.*
On the ground. Peradeniya, Nov. 1868.

709. G. mirabilis, *Mont. Syll.* p. 286. (No. 184 in part.)
On the ground. 1854.
Spores ·00015–·0002 in diameter, even.

710. Trichocoma paradoxum, *Jungh. Fl. Crypt. Javæ,* p. 10, fig. 7. (No. 1011.)
On dead trunks of trees. Peradeniya, Dec. 1868. *Dr. Harvey,* 1853.

711. Tulostoma exasperatum, *Mont. Cub.* p. 317. (No. 1008.)
On the ground. Central province, Dec. 1866.
Spores ·0002 in diameter, strongly echinulate.

712. Bovista lilacina, *Mont. & Berk. Hook. Lond. Journ.* 1845, p. 64. (No. 1010.)
On the ground. Central province, Dec. 1868.
Spores globose, echinulate, ·0002 in diameter.

This is sold at Rangoon in the bazars, when young, as an esculent.

713. Bovista bicolor, *Lév. Ann. Sc. Nat.* 1846, v. p. 162. (No. 727.)
On the ground. Peradeniya, Aug. 1868.
Three inches or more across; spores ·0002 in diameter, echinulate.

714. B. cervina, *B. Ann. Nat. Hist.* ix. p. 447; *Gardn.* (No. 17.)
On the ground. Peradeniya, June 1844.

715. B. velutina, *B. & Br.* Globosa, spadicea, velutina, e mycelio

membranaceo albo oriunda, peridio interno tenui, capillitio sporisque fuscis (no. 195).

On dead bark. Nov. 1867.

About ½ an inch in diameter; spores ·00015, globose, even.

A very pretty and distinct species, remarkable for the thickness of the outer coat.

716. LYCOPERDON GARDNERI, *B.* Peridio subhemisphærico fulvo, serius rimoso glabriusculo, deorsum in stipitem crassum obconicum plicatum angustato; capillitio pallido, sporis argillaceis. *Gardn.* no. 9, cum icone. (No. 739 cum icone.)

In shady places. May 1844, *Gardner*; July–Nov. 1868.

Peridium 4½ inches across, subhemispherical, tawny, contracted below into an obconical rugose stem, which roots at the base into the soil; sometimes the stem is cylindrical, thick, and very obtuse; capillitium gradually passing into the finely cellular stem.

Referred formerly to *L. saccatum*; but a further supply of specimens shows that it is distinct. Spores ·00015 in diameter, more irregular than usual, apparently hollowed out on one side as in many Agarics. There is a variety in which the stem has fine minute floccose warts.

717. L. ATROPURPUREUM, *Vitt.*, var. (No. 192.)

With the habit of *L. pyriforme*, but with the spores of *L. atropurpureum*. Spores echinulate, ·0002.

718. L. GAUTIEROIDES, *B. & Br.* Citrinum, irregulare, suborbiculare, brevissime stipitatum, rugoso-lacunosum, pulverulentum; sporis subellipticis (no. 1006 cum icone).

On burnt earth. Central province, Dec. 1868.

Nearly 2 inches across, subglobose, irregular, somewhat lobed, rugose and lacunose, deeply umbilicate below; stem short, obconical; spores subelliptic, ·0002 in diameter; capillitium gradually radiating from the spongy tissue of the stem, which penetrates deeply into the peridium.

More like the large Cuban *Lyc. rugosum* than any other species.

719. L. PHLEBOPHORUM, *B. & Br.* Ochraceum, irregulare v. subglobosum, extus venoso-reticulatum; stipite brevissimo, sursum dilatato, pulveraceo (no. 194 in part).

Amongst dead leaves. Nov. 1867.

About an inch across; slightly rooting, with a few branched white fibres.

Unfortunately the spores are not yet perfect.

720. L. Rubecula, *B. & Br.* Peridio cum stipite crasso basi rugoso, conico-turbinato, candido, deorsum glabro, sursum verrucis minutissimis rufis picto; mycelio fibrilloso albo (no. 311 cum icone).

On the ground.

Peridium with stem ¾ inch high; flocci white, distinct from the base as in *L. cælatum*; spores brownish, even, globose, ·00015–·0002 in diameter.

721. L. echinatum, *P.*

Var. *echinellum, B. & Br.* (No. 194.)

On the ground. Peradeniya, 1868.

Much less strongly echinate than the normal form, rufous, base small not ending abruptly; spores ·0002 in diameter, even.

722. L. echinulatum, *B. & Br.* Peridio turbinato, verrucis parvis echinulato-fasciculatis aspero, deorsum in stipitem obconium angustato; sporis globosis lævibus.

On the ground.

From 1–1¼ inch across, sometimes ending more abruptly and rooting.

723. L. conspurcatum, *B. & Br.* Globosum; peridio minute verrucoso, hic illic rimoso, basi minima breviter radicante; capillitio sporisque pedicellatis olivaceis (no. 193 bis).

On the ground. Peradeniya, Nov. 1868.

Scarcely an inch across, rough with minute warts, and cracked; spores ·00015 in diameter, ·0005 long, like those of *L. citrinum.*

Externally resembling *L. australe*, but with differently coloured spores, which are stipitate. *L. delicatum* has echinulate spores.

724. L. citrinum, *B. & Br.* Ellipsoideum, citrinum, minutissime verrucosum, stipite nullo; mycelio candido fibrilloso cum radice longa connexo; sporis pedicellatis olivaceis (no. 738 cum icone).

On the ground. July 1868.

Spores ·00015 in diameter, ·0005 long with stem.

The specimens are not perfect; but as there is an excellent figure we venture to name the species.

725. L. pusillum, *Bull.* (No. 193.)

On dead wood. Peradeniya, Nov. 1868.

726. Scleroderma columnare, *B. & Br.* Peridio elliptico areolato, demum fisso, in stipitem cylindricum e mycelio spongioso oriundum desinente; massa sporacea a stipitis substantia distincta (no. 674 cum icone).

On the ground. Peradeniya, June, July 1868.

Peridium 1¼ inch across, pale, either nearly smooth and areolate or distinctly warty; wrinkled when dry, splitting above when old; stem 1–¾

inch high, $\frac{1}{3}$–$\frac{1}{2}$ thick, solid, partially furfuraceous, yellow and pink within; mycelium forming a reticulated spongy mass. The substance of the stem is continued all round the mass of the spores so as to form a lining to the peridium; spores ·0004–·0005 in diameter, verrucose, separated from the substance of the stem as in *Lycoperdon cælatum*.

If the lining of the peridium is of generic value, this would belong to Léveillé's genus *Sclerangium*. The single specimen from Sikkim, referred to *S. Bovista*, is probably the same species.

727. CYATHUS MONTAGNEI, *Tul. Ann. d. Sc. Nat.* 1844, i. p. 70. (No. 185.)

On decaying bamboo stems. July 1, 1866.

Spores ·0008 long.

728. C. EMODENSIS, *B. Hook. Kew Journ.* 1854, p. 204. (No. 1223.)

Horton Plains, 7000 ft. March 1870.

Spores ·0003 long.

729. NIDULARIA DURIÆANA, *Tul. Ann. Sc. Nat.* 1854, i. p. 99. (No. 1022.)

Spores ·0003 long by ·0002. The very thin peridium is characteristic.

No. 309 is a young *Nidularia*, but too imperfect to determine.

730. SPHÆROBOLUS STELLATUS, *Tode*. (Nos. 1012, 85.)

On decayed stems of *Musa*. No. 85, Peradeniya, 1600 ft., Nov. 1867.

731. S. RUBIDUS, *B. & Br.* Peridio exteriore rubro, ore irregulari; sporangio rubro (no. 312).

On Elephants' dung.

Spores oblong, ·0003 long.

732. LYCOGALA AFFINE, *B. & Br.* Globosum, punctatum, sporis minutis leviter echinulatis (no. 82).

On dead wood.

Spores ·0002 in diameter, whereas those in *L. epidendrum* are ·00028–·0003.

733. L. EPIDENDRUM, *Buxb.* (Nos. 314, 315, 316.)

On dead wood. Nuwara Eliya, 6000 ft.

Spores ·0003 in diameter.

734. L. NITIDUM, *B. & Br.* Peridio tenerrimo griseo nitido, ore stellatim rupto, sporis pallidis (no. 313).

735. L. ATROPURPUREUM, *B. & Br.* Peridiis ovatis atropurpureis apice pallidis, sporis globosis hyalinis (no. 254).

On dead wood. Nuwara Eliya, 6600 ft.

Placed provisionally in this genus. Fixed at the base by an orbicular stratum of sarcode, of which there is often a trace on the truncate apices; rather rough or furfuraceous. About the size of *Sphæria bombarda.* Probably a new genus.

736. RETICULARIA LURIDA, *B.* & *Br.* Depressa, olivacea, ex hypothallo niveo oriunda, floccis erectis ochraceis, sporis concoloribus (no. 259).

On dead wood.

Flocci abundant, even; spores ·0005 in diameter.

737. R. APIOSPORA, *B. & Br.* Effusa, dendritica, fulva; peridio fibroso-sericeo; sporis obovatis, basi breviter auctis hyalinis (no. 266).

On dead wood.

Resembling, when young, *Hymenochæte dendritica*: spreading widely; peridium consisting of branched silky fibrils; spores ·0003 long, ·00015 wide.

738. R. ATRO-RUFA, *B. & C. Journ. Linn. Soc.* x. p. 347. (No 17.)

On bark covered with moss. Peradeniya, Nov. 1867.

Spores globose, ·0002 in diameter.

739. R. VENULOSA, *B. & C. l. c.* (No. 84.)

On dead wood and mosses. Nov. 1867.

740. R. FULIGINOSA, *B. & Br.* Effusa, tenuis, ex olivaceo fusca, sericea; sporis magnis globosis floccisque atropurpureis lævibus (no. 247).

On leaves of some palm.

Spores like those of *R. lurida.*

Accompanied by an *Helicoma.*

741. ÆTHALIUM SEPTICUM, *Fr.* (*a*, Nos. 196, 261.) (*d*, Nos. 136, 218.)

On various decaying substances. *a, flavum,* Nuwara Eliya; *d, violaceum,* Nov. 1867.

742. DIDERMA SUBLATERITIUM, *B. & Br.* Congestum, collabens, deplanatum, glaberrimum; peridio exteriore pallide lateritio, intus candido furfuraceo; interiore cinereo; columella conformi; floccis pallidis; sporis dilute brunneis (no. 26).

On dead leaves. Peradeniya, Nov. 1867.

Looks at first like the eggs of some moth. Spores ·0003 in diameter.

Allied to *D. testaceum.*

743. D. DEPLANATUM, *Fr.* (No. 40.)
On dead leaves &c. Peradeniya, Nov. 1867.

744. D. DEPRESSUM, *Fr.* (No. 75.)
On dead leaves &c. Nov. 1867.
Spores ·00035 in diameter.

745. DIDYMIUM CLAVUS, *A. & S.* (No. 117.)
On various decaying substances. Peradeniya, Nov. 1867.
An almost stemless form.

746. D. COMMUTABILE, *B. & Br.* Stipite sursum attenuato, albo, subtiliter pulverulento, demum pallescente lævi vel substriato tortoque; peridio subtus cupulæformi, utrinque farinoso, demum circumscisso (no. 120).
On dead herbaceous substances. Nov. 1867.
A small species.

747. D. NEGLECTUM, *B. & Br.* Stipite pallido, sursum, attenuato, sulcato; peridio subgloboso umbilicato albo-farinaceo; columella concolori, floccis albis; sporis atris (no. 25).
On bark. Peradeniya, 1867.
Spores ·0003 in diameter.
Allied to *D. squamulosum.*

748. D. FARINACEUM, *Schrad.* (Nos. 76, 118.)
On dead leaves &c. Nov. 1867.
Flocci white; spores ·00035–·0004 in diameter.

749. D. NIGRIPES, *Lk.* (No. 573.)
Dolosbagey, May 1868.

750. D. LEONINUM, *B. & Br.* Stipite conico fulvo lævi, basi orbiculari, concolori; peridio subgloboso corpusculis fulvis echinatis crystallinis sparso (no. 21).
On dead leaves. Peradeniya, Nov. 1867.

Clearly allied to *D. tigrinum*; but the corpuscles, instead of being mere scales, consist apparently of a number of crystals resembling somewhat those of lithic acid; the base when seen under the microscope is of a bright yellow.

751. D. MELLEUM, *B. & Br.* Stipite conico albo; peridio globoso melleo subtiliter pruinoso; columella e stipite intruso oriunda; floccis albis (no. 63).
On dead leaves. Peradeniya, Nov. 1867.
Flocci reticulated; spores ·0004 in diameter.
Allied to *D. xanthopus* and *D. Iridis.*

752. D. LEUCOPUS, *Lk.* (No. 68.)
On dead leaves and bark. Nov. 1867.

A large form.

753. D. BULBILLOSUM, *B & Br.* Stipite conico albo lævi, basi bulbilloso; peridio globoso farinaceo; sporis floccisque nigris conglomeratis (no. 21 in part).
On dead leaves. Peradeniya, Nov. 1867.

754. D. ZEYLANICUM, *B. & Br.* Stipite elongato, sursum attenuato, rufo; peridio globoso umbilicato candido; capillitio pallido vel candido; sporis nigris.
On dead wood. Ceylon, 1851.
Threads pale or entirely white; spores ·0004 in diameter.

755. D. EFFUSUM, *Lk.* (No. 1024.)
On dead leaves &c. Peradeniya, Jan. 1869.

756. D. CINEREUM, *Fr.* (Nos. 55, 135.)
On various decaying substances. Nov. 1867.
Spores ·0005 in diameter.

No. 135 is a very gregarious form, with larger spores ·0006. Substratum farinaceous.

757. D. CROCEO-FLAVUM, *B. & Br.* Gregarium, sessile, extus flavum farinaceum, intus croceum; floccis flavis; sporis fulvis (no. 143).
On dead leaves &c. Nov. 1867.
Spores ·00045 in diameter.

A very pretty species, easily breaking up, and leaving behind a saffron cup dotted with the yellow flocci.

758. ANGIORIDIUM SINUOSUM, *Grev.* (No. 129.)
On dead bark. Nov. 1867.
Spores ·0005 in diameter. Peridium reticulated.

759. PHYSARUM NUTANS, *P.* (No. 25.)
On various decaying substances. Nov. 1867.
γ. *aureum* (nos. 73, 574).
On decayed *Polypori* &c. Dolosbagey, May 1868.

760. P. ROSEUM, *B. & Br.* Stipite gracili, peridio globoso, capillitio sporisque roseis (no. 1037).
On dead bark &c. Peradeniya, Jan. 1860.
Stem attenuated upwards; spores ·00025 in diameter.

Near *P. pulcherrimum*, which, however, has a much more rigid and darker stem. It greatly resembles *Cribraria purpurea*, but is much smaller.

761. P. VIRESCENS, *Dittm.*
Var. *flavum*. (No. 271.)
On various dead substances.
Flocci sulphur-coloured or white.

762. P. RUFIBASIS, *B. & Br.* Stipite rufo sulcato, e basi parva orbiculari scariosa concolori oriundo; peridio floccisque luteis; sporis atropurpureis (no. 1045).
On dead leaves.

763. CRATERIUM LEUCOCEPHALUM, *Dittm.* (Nos. 101, 119.)
On dead leaves, herbaceous stems &c. Peradeniya, Nov. 1867.
Spores ·00035–·0004 in diameter.

764. C. PEDUNCULATUM, *Trent.* (No. 1036.)
On lichens, dead leaves &c. Peradeniya, Dec. 1868.

765. DIACHEA ELEGANS, *Fr.* (Nos. 16, 263.)
On dead leaves &c.

766. STEMONITIS FUSCA, *Roth.* (Nos. 47, 64.)
On various decaying substances.

767. S. FERRUGINEA, *Fr.*
On various decaying substances. Madamahanewera, 2000 ft.
Spores ·0002–·00025 in diameter.

768. S. TYPHOIDES, *D.C.* (No. 575.)
On rotten wood. Dolosbagey.

769. DICTYDIUM UMBILICATUM, *Schrad.*
On decayed wood. Madamahanewera.

770. ARCYRIA PUNICEA, *Fr.* (Nos. 20, 12, 21, 22, 70, 126.)
On dead wood.
Spores ·00045 in diameter.

In no. 20 the capillitum is not so bright as in the normal form.

771. A. INCARNATA, *Fr.* (No. 115.)
On dead wood &c. Nov. 1867.

772. A. NUTANS, *Fr.* (No. 1035.)
On various decaying substances. Central province, Dec. 1868.

773. A. UMBRINA, *Schum.* (No. 24.)
On decayed wood. Nov. 1867.

774. A. CINEREA, *P.* (No. 116.)
On decayed wood.

775. TRICHIA PYRIFORMIS, *Hoffm.* (No. 436.)

On decayed bark, wood &c. Habgalla, Dec. 1867.

Spores ·0004 in diameter, tuberculated.

776. T. Thwaitesii, *B. & Br.* Stipite brevi cylindrico; peridio tenui fulvo, demum sursum evanescente; floccis concoloribus (no. 22).

On very decayed wood. Nov. 1863.

Spores globose, ·0003 in diameter, sometimes elongated as if two had coalesced.

At first sight resembles a little ovate *Arcyria*.

777. T. serpula, *P.* (Nos. 83, 130, 139, 119 bis.)

On various decaying substances. Nuwara Eliya.

Threads hispid. Spores papillate, ·0005–·0006 in diameter.

778. T. chrysosperma, *D.C.* (No. 272.)

On decayed wood.

779. Licea cylindrica, *Fr.*

On dead wood.

780. L. fragiformis, *Nees.* (Nos. 132, 1018.)

On dead wood. Peradeniya, Nov. 1867, Dec. 1868.

781. L. reticulata, *B. & Br.* Adnato-serpula, reticulata, opaca, umbrina; sporis subconcoloribus (no. 429).

On bark. Peradeniya, Dec. 1867, 1868.

Flocci few, wavy, sometimes forked and again united so as to leave an elliptic open space. Spores ·0005–·0006.

Allied to *L. serpula*, which appears to be much darker both as to the spores and peridia.

782. L. cinnabarina, *B. & Br.* Depressa, tenuis, irregularis, superficie minute papillata, coccinea; sporis globosis lævibus concoloribus (no. 663).

On bark. South of island.

Hypothallus white, distinct; spores ·0005–·0006.

Resembling in habit *L. applanata*, B.

783. L. tenuissima, *B. & Br.* Tenuissima, rufa, nitida, glaberrima, minutissime reticulata; margine primum byssoideo; floccis aculeatis; sporis globosis hyalinis (no. 324).

On dead bark.

Spores ·0003 in diameter.

Alwisia, *B. & Br.*

Peridium subcoriaceum, fusiforme, glabrum, demum apice stellato-fissum vel plura in apice stipitis communis insidentia flocci

irregulares, deorsum dilatati, sursum angustiores furcati; sporæ subglobosæ, nucleo magno lævi.

784. A. BOMBARDA, *B. & Br.* (No. 626.)
On decayed wood. Gongolla forest, July 1864.

A highly curious fungus, with the habit of *Trichia rubiformis*, with, however, very different flocci, some of which are obtuse, resembling those of *Rhinotrichum*, and apparently bearing the spores about $\frac{1}{10}$ of an inch high. Peridia seated six or eight together on the top of the common stem, dark purple, black, or brown.

CONIOMYCETES.

785. DIPLODIA RADULA, *B. & Br.* Peritheciis minutis epidermidem albifactam elevantibus, ostiolis distinctis; sporis ellipticis (no. 305).
On *Musaceæ*.
Spores ·001 inch long, narrower than in the next species, dark, with a wedge-shaped pedicel.

786. D. CIRCINANS, *B. & Br.* Peritheciis circinantibus epidermide nigrifacta centro pallido tectis; sporis brevibus ellipticis obtusissimis (nos. 356, 357).
On *Yucca gloriosa*.
Perithecia 2–3 under each spot; spores ·001 inch long, ·0005 wide.

(No. 358) is a variety with the pustules more scattered, but without fruit.

787. D. CATHARTOCARPI, *B. & Br.* Peritheciis congestis e macula pallida oriundis minutissimis epidermidem elevantibus, ostiolo latiusculo; sporis oblongis utrinque subalternatis (no. 525).
On either surface of leaves of *Cassia fistula*. Damboul, Feb. 1868.
Spores ·0005–·001 long by ·0002. Besides there are minute conidia ·00015–·0002.

788. SPHÆROPSIS ANOMALA, *B. & Br.* Maculis minutis aterrimis rugosis, peritheciis confusis; sporis obovatis e stipite brevi articulo divisis, demum uniseptatis (no. 481).
On *Artocarpus Lakoocha*, var. β. Peradeniya, Jan. 1868.
Spores ·0013 long.

789. S. UNDULATA, *B. & C. Journ. Linn. Soc.* x. p. 352. (No. 648.)
On dead bark. South of the island, July 1868.
Spores ·0005–·0006 long by ·0003–·0004.

No. 30 seems a form of the same with spores ·0007 long.

790. S. Diospyri, *B. & Br.* Nitida, congesta, incarcerata, epidermidem elevans; sporis magnis; paraphysibus longis (no. 1131).
On fruit of *Diospyros embryopteris*. Peradeniya, Dec. 1868.
Spores ·001 long.

791. S. seminicola, *B. & Br.* Minuta, gregaria, libera, setis rigidis sparsa; sporis oblongis angustis obtusis (no. 1132).
On seeds of *Artocarpus integrifolia*. Peradeniya, Dec. 1868.
Spores ·0005 long.

792. S. annularis, *B. & Br.* Lateritia, peritheciis centro depressis; sporis subcuneiformibus (no. 114).
On dead wood. Nov. 1867.
Looks like a collapsed *Nectria*; spores ·0005 long.

793. Myrosporium rufum, *B. & Br.* Placentæforme, rufum, nitidum, collabens; sporis subellipticis (no. 1016).
On petioles apparently of some palm. Peradeniya, Dec. 1868.
Looks at first sight like a collapsed *Hypocrea*. About half a line broad; spores rather variable in form, elliptic, obovate, or subcymbiform, ·0005–·0006 long, ·0004 wide. It seems to come nearer to Corda's genus than any other. Had the perithecium been black, it might rather have been referred to *Coccularia*, Cd.

794. Hendersonia Symploci, *B. & Br.* Peritheciis nitidis, sæpe circinantibus; sporis fusiformibus triseptatis (no. 592).
On *Symplocos obtusa*, Wall. Central province, 5000 ft.
Spores ·0012 long.
(No. 455) is a doubtful species of the same genus.

795. H. constricta, *B. & Br.* Peritheciis subglobosis pruinatis, basi floccis radiantibus suffultis; sporis metulæformibus uniseptatis, medio constrictis (no. 351).
On dead wood.
Spores ·0009 long.

796. Darluca Filum, *Cast.* (No. 1142.)
On a *Uredo* on *Panicum repens*.

797. Dinemasporium gelatinosum, *B. & Br.* Superficiale, in epidermide nigra insidens; sporis hyalinis magnis breviter fusiformibus ellipticisve (no. 556).
On dead twigs. Central province, Feb. 1868.
Spores ·0013 long.
Nos. 670 and 1128, with little short white perithecia, appear to belong to the genus *Sphæronema*, but are destitute of fruit.

798. Aschersonia mellea, *B. & Br.* Pulvinata, mellea, glabra, cellulis demersis, sporis subellipticis nucleatis (no. 730).

On dead bark. South of the island, July 1868.

A line or more across.

799. A. placenta, *B.* Flava, orbicularis, centro rugosa, margine membranaceo candido; sporis breviter fusiformibus.

On leaves of *Loranthus* and *Memecylon capitellatum*, also from Marquesas by E. Jardin.

Quite superficial, like a coccus; spores ·0002 long.

800. Ephelis brevis, *B. & Br.* Solida, nigra; sporis minutis brevibus linearibus (no. 452).

On *Anthisteria tremula*. Peradeniya, Dec. 1862.

Spores ·00016 long.

Looks at first like an *Ergot*.

801. Phoma pelliculosum, *B. & Br.* Griseum, e matrice secernibile; peritheciis minutissimis epidermidem elevantibus, ostiolo amplo; sporis angustis, quam sporophoris triplo brevioribus (no. 438).

On bamboo. Peradeniya, Dec. 1867.

Peeling off in little ragged shreds; spores ·0001 long.

802. P. Lobeliæ, *B. & Br.* Pustulis epidermide alba tectis, demum emersis; sporis ellipticis (no. 301).

On *Lobelia nicotianæfolia*. Nuwara Eliya.

Spores ·00015 long.

No. 306 appears to belong to the genus, but is without fruit.

803. P. hysterioideum, *B. & Br.* Ellipticum, nigrum, epidermide cinctum, opacum; sporis oblongis minimis (no. 509).

Possibly a state of *Dothidea graminis*.

804. Melanconium melanoxanthum, *B. & Br.* Pustulis orbicularibus erumpentibus floccis granulisve flavis cinctum; sporis subglobosis angulatisve (no. 124).

On petioles of *Caryota urens* and other palms. Nov. 1867, Dec. 1868.

Resembling at first sight a *Stictis*; spores ·0006 long. Occurs also in Mauritius.

Torulacei.

805. Pestalozzia congesta, *B. & Br.* Cellulis congestis prominulis brunneis; sporis oblongis uniseptatis (no. 511).

On underside of leaves of *Syzygium Jambolanum*. Peradeniya, Feb. 1868.

Forming little brown patches about a line wide.

806. Septonema olivaceo-nigrum, *B. & Br.* Pulvinulis tomentosis olivaceo-nigris congestis; sporis 4-articulatis, articulis globosis, echinulatis e floccis ramosis articulatis oriundis (no. 248).

Apparently on leaves of *Agave*.

Spores ·0008 long.

807. Bactridium clavatum, *B. & Br.* Melleum, pulvinulatum; sporis clavatis 4-septatis, articulo medio majore (no. 240).

On dead wood. Nuwara Eliya.

Spores when mature ·008 long.

808. Sporidesmium tessarthrum, *B. & C. Journ. Linn. Soc.* x. p. 355. (No. 505.)

On *Andropogon*. March 1867.

809. S. polymorphum, *Cd.* (No. 1030.)

On dead wood. Peradeniya, Dec. 1868.

810. Chætopsis graminicola, *B. & Br.* Sporis globosis quaternis lævibus (no. 505 in part).

On leaves of *Andropogon*.

Main filament subulate, articulated, dark below, nearly hyaline above; spores globose, four together at the tips of the lateral basal threads.

Habit exactly like that of *Chætopsis Wauchii*, Grev.

811. Gymnosporium circumscissum, *B. & Br.* Maculæ oblongæ; cuticula circumscissa; sporis nigerrimis globosis vel subglobosis lævibus (no. 1050).

On bamboo. Peradeniya, Jan. 1869.

Spores ·0003 long.

812. G. cinctum, *B. & Br.* Sporis globosis aterrimis, floccis erectis septatis cinctis (no. 1140).

On leaves of *Andropogon muricatum*. Damboul, Nov. 1868.

Spores ·0002 in diameter.

Exactly the habit of *Excipula*; but the spores are totally different and resemble those of *Gymnosporium*.

813. G. confusum, *B. & Br.* Effusum, nigrum; sporis magnis subglobosis.

With *Monotospora fusigera*.

Spores ·0001–·0008 in diameter.

814. G. lineare, *B. & Br.* Soris linearibus, e cuticula bilabiatis; sporis obovatis brevissime stipitatis (no. 506).

On *Andropogon muricatum*, March 1868.

Spores ·0005 long.

815. PUCCINIA CONGESTA, *B. & Br.* Maculis flavis effusis hypophyllis late confluentibus; soris congestis; sporis longe pedicellatis, fortiter constrictis, ferrugineis (no. 491).

Habgalla. Jan. 1868.

Spores ·002 long, pedicels ·0045.

The sori often run along the midrib, but are by no means confined to it, much crowded, often lifting up the common cuticle.

816. P. ABUTILI, *B. & Br.* Maculis effusis amphigenis luteis vel nullis; soris latis nigris cuticula scariosa circumdatis; sporis brevibus obovatis obtusissimis lævibus, pedicello brevi (no. 523).

On *Abutilon graveolens.* Kandy, Feb. 1868.

Spores ·0014 long by ·0008 wide; very different from those of *P. malvacea.*

817. P. TABERNÆMONTANÆ, *B. & Br.* Maculis flavis; soris minimis hypophyllis peritheciiformibus; sporis obovatis obtusissimis brevibus lævibus, pedicello brevi (no. 439).

On *Tabernæmontana dichotoma.* Peradeniya, Jan. 1868.

At first it does not look like a *Puccinia.* Spores ·0016 long.

No. 474, on *Emilya sonchifolia,* is uncertain, as there is no fruit.

818. P. THWAITESII, *B.* Maculis flavis hypophyllis; soris innumeris minutissimis brunneis in plagas orbiculares dispositis; sporis constrictis, pedicello elongato (no. 451).

On *Justicia gendarussa.* Peradeniya, 1867, Jan. 1850.

Spores ·0015 long, with the pedicel ·006, very like those of *P. congesta,* but the colour quite different, as also the whole habit.

819. P. TREMANDRÆ, *B.* Maculis nullis; soris sparsis hypophyllis ferrugineis; sporis pallidis elongatis apiculatis.

On *Tremandra oppositifolia,* W. H. Harvey.

Outer coat of spores consisting of several layers.

820. P. SPONGIOSA, *B. & Br.* Soris magnis crassis; sporis subellipticis obtusissimis uniseptatis nec medio contractis (no. 508).

On *Stylocoryne Weberi.*

821. P. FLACCIDA, *B. & Br.* Soris parvis brevibus; sporis flaccidis, pedicello longo hyalino, obtusis, medio contractis (no. 1136).

On *Panicum.* Peradeniya.

Spores ·004 long, with pedicels ·009.

It differs from *P. graminis* in its very flaccid spores and in other points.

822. Triphragmium Thwaitesii, *B. & Br.* Sporis globosis, processibus bifurcatis ornatis.

On leaves of *Hedera Vahlii*. Peradeniya, April 1861.

823. T. clavellosum, *B. in Gardn. Chron.* 1857. Sporis obovatis, processibus apice emarginatis ornatis.

On *Paratrope terebinthacea*.

At first obovate, simple, then divided by a horizontal septum; the upper articulation divided into two vertically. Spots on *Hedera* and *Paratrophe*, broad and diffuse; in the Canadian specimens much narrower.

824. Uromyces Thwaitesii, *B. & Br.* Maculis luteis hypophyllis; soris circinantibus brunneis; sporis obovatis lævibus longissime pedicellatis (nos. 9, 450 in part).

On leaves of *Sida humilis*, Willd., and *S. hirsuta*. Peradeniya, Jan. 1855, Dec. 1867

There are rarely two cystoblasts parallel to each other.

825. U. verruculosa, *B. & Br.* Maculis flavis amphigenis; soris subcircinantibus; sporis ellipticis breviter pedicellatis verruculosis (no. 519).

On leaves of *Bauhinia tomentosa*. Damboul, March 1868.

826. U. Blainvilleæ, *B.* Maculis nullis; soris hypophyllis effusis brunneis; sporis globosis verrucosis processu obtuso apicali hyalino.

On *Blainvillea latifolia*, 1858. Batticabra district.

Spores ·0013 in diam.

827. U. linearis, *B. & Br.* Soris hypophyllis linearibus epidermide arcte constrictis; sporis globosis lævibus brunneis, quandoque obliquis, vel obtusissime apiculatis pedicellatis elongatis (no. 597).

On *Panicum repens*. Peradeniya, March 1868.

Spores ·001 long, pedicel ·0035.

828. Lecythea Baryi, *B. Outl.* p. 334. (No. 460.)

On *Bambusa Thouarsii*. Peradeniya, Jan. 1868.

Very imperfect, but apparently the same with the European species.

829. Uredo Dolichi, *B. & Br.* Soris hypophyllis sparsis epidermide cinctis pallidis; sporis subglobosis echinulatis (no. 408).

On leaves of *Dolichos*. Peradeniya, Dec. 1867.

Spores ·001 in diameter.

830. U. Rueliæ, *B. & Br.* Soris hypophyllis sparsis brunneis; sporis globosis, fortiter echinulatis (no. 467).

On leaves of *Ruellia prostrata*. Jan. 1868.

Spores ·001 in diameter.

831. U. RUBIGO VERA, *D. C.* (No. 620.)
On grasses; on *Scleria zeylanica.* South of the island, July 1868.
It is however only a form of *Puccinia graminis.*

832. U. ARTOCARPI, *B. & Br.* Maculis fuscis; soris minutis hypophyllis; sporis cuticula fusca incarceratis ovatis echinulatis (no. 480).
On leaves of *Artocarpus Lakoocha.*

833. HEMILEIA CANTHII, *B. & Br.* Sporis simplicibus triplicibusque extus granulatis, intus concavis lævibus (no. 503).
On *Canthium campanulatum.* March 6, 1868.

834. H. VASTATRIX, *B. & Br. Gardn. Chron.* Nov. 6, 1869, cum icone.
On Coffee-leaves.
A very destructive pest.

835. RAVENELIA INDICA, *B. in Gardn. Chron.* 1853, p. 132. Pseudosporis longe pedicellatis; cellulis suffulcientibus processu filiformi semipercursis (no. 517).
On *Bauhinia tomentosa* and *Cassia abrus.* Damboul, March 1868; also from Behar.
Spores ·0013–·004 across.

836. R. SESSILIS, *B.* Pseudosporis sessilibus, subtus cellulis pellucidis magnis suffultis (no. 1105).—Ravenelia glanduliformis, *Rav. Exs.* iii. no. 72, non *Berk. Int.* p. 305.
On leaves of *Acacia Lebbek.*
Spores ·004 across, with sometimes a few radiating myceloid threads.
No. 1135, on *Gleditschia,* is the same species.

837. R. ACULEIFERA, *B.* Pseudosporis sessilibus, e cellulis paucis compactis, basi cellulis magnis pellucidis suffultis; processibus brevibus hyalinis e cellulis demum radiantibus.
On *Megonemium enneaphyllum.*
Spores ·00$\dot{3}$.

838. R. MACROCYSTIS, *B. & Br.* Pseudosporis e cellulis paucis magnis compactis e mycelio radiante oriundis (no. 515).
On *Cassia Tora.* Damboul, March 1868.
Spores ·0015.

839. R. STICTICA, *B. & Br.* Soris minutis; pseudosporis pallidis orbicularibus, cellulis extus breviter echinatis (nos. 493, 501).
On the underside of leaves of *Pongamia glabra* and *Tephrosia suberosa.*
The larger pseudospores are accompanied by Uredinoid bodies (at least in 493) which are minutely papillate.

840. Ustilago leucoderma, *B. Ann. Nat. Hist.* March 1852. (No. 458.)

On *Rhynchospora aurea*. Ratnapoora.

Spores ·0005–·0006.

841. U. Scleriæ, *Tul.* (Nos. 450, 459.)

Spores ·0008–·001.

842. U. spermoidea, *B. & Br.* Elongata, epidermide papyracea cincta; sporis angulatis irregularibus (no. 589).

On *Cymbopogon Martii*. Dolosbagey, May 1868.

Looks at first like a pale ergot; the cuticle like thin kid leather.

843. U. endotricha, *B. Fl. New Zeal.* ii. p. 196 (cum icone). (No. 587.)

On *Carex bengalensis*. Dolosbagey, May 1868.

Spores ·0002–·0005 long by ·00015–·0004.

There are more fibres than in the New-Zealand species on *Gahnia*, but there is apparently no essential difference.

844. Thecaphora inquinans, *B. & Br.* Semina tota implens; sporis angulatis conglomeratis; pedicellis elongatis pellucidis (no. 588).

On *Paspalum scrobiculatum*. Dolosbagey, May 1868.

Spores 3–7 together ·0004–·0007 across collectively. Turning the whole contents of the seed into a black powder.

845. Polycystis macularis, *B. & Br.* Soris brevibus spicicolis; sporis globosis paucicellulosis (no. 507).

On *Andropogon perforatus*. Damboul, March, 1868.

846. Æcidium erythrobasis, *B. & Br.* Maculis hypophyllis rubris; pseudoperidiis cylindricis brevibus laciniatis (no. 500).

On leaves of *Hibiscus eriocarpus*. March 1868.

847. Æ. ceraceum, *B. & Br.* Maculis flavis; pseudoperidiis sparsis, quandoque petiolos ambientibus, margine angusto denticulato (no. 440).

On *Tabernæmontana dichotoma*.

The spots have a peculiar waxy appearance; spores angular, granulated, ·002 long.

848. Æ. Argyreiæ, *B. & Br.* Maculis pallidis amphigenis; pseudoperidiis sparsis, in pagina inferiore apertis, margine obsoleto; sporis angulatis (no. 463).

On *Argyreia elliptica*. Peradeniya, Jan. 1868.

849. Æ. Hiptages, *B. & Br.* Maculis ochraceis orbicularibus amphigenis; pseudoperidiis minutis congestis peritheciiformibus (no. 461).

On leaves of *Hiptage*. Peradeniya, Jan. 1868.

850. Æ. DESMIUM, *B. & Br.* Maculis nullis; pseudoperidiis hypophyllis inclusis, ore angusto; sporis oblongo-cuneatis asperulis (no. 471).
On *Gossypium.* Peradeniya, Jan. 1868.
Looking at first like perithecia, with minute white disk, at length opening with a narrow orifice; spores ·0012 long.

851. Æ. MILIARE, *B. & Br.* Effusum; pseudoperidiis in pagina superiore minutis peritheciiformibus, in pagina inferiore cupulæformibus margine elevato.
Abundant on the upperside of the leaves; but a few only come to perfection, exhibiting a yellow open disk.
Spores globose, ·0008 in diameter.
Var. maculis pallidis vel nigrescentibus irregularibus; pseudoperidiis in pagina superiore peritheciiformibus, in inferiore cylindricis, basi cuticula nigrifacta cinctis; sporis angulatis (no. 522).
On leaves of *Diospyros ovalifolia.* Damboul, March 1868.
Spores ·0009 in diameter.

852. Æ. FLAVIDUM, *B. & Br.* Maculis effusis flavidis hypophyllis; soris sparsis; pseudoperidiis margine crenatis laceris (no. 524).
On leaves of *Pavetta indica.* Peradeniya, Feb. 1868.

853. Æ. DIOSCOREÆ, *B. & Br.* Maculis rufis amphigenis; pseudoperidiis peritheciiformibus, in pagina superiore sero ruptis (no. 729).
Peradeniya, July 1868.

854. Æ. PAVETTÆ, *B. Hook. Journ.* 1853, p. 231. Maculis orbicularibus hypophyllis nigris tenuibus, pseudoperidiis sparsis, margine angusto.
On *Pavetta indica.*

855. Æ. RHYTISMOIDEUM, *B. l. c.* Maculis orbicularibus hypophyllis; pseudoperidiis e crusta nigra oriundis, margine lobato latiusculo; sporis subglobosis lævibus.
On leaves of *Diospyros.*

856. Æ. NUMMULARE, *B.* Maculis flavis; pseudoperidiis in plagas orbiculares congestis, margine angusto; sporis lævibus.
On *Ceropegia candelabrum.*
Patches $\frac{1}{4}$–$\frac{1}{2}$ inch across.

857. Æ. CHIONANTHI, *B. & Br.* Crassiusculum, congestum; pseudoperidiis incarceratis nec prominentibus, ore irregulari; sporis candidis rugosis (no. 1138).
On leaves of *Chionanthus.*
Forming rufous thick patches; spores ·001 long, with little wrinkles.

858. Æ. UMBILICATUM, *B. & Br.* Sparsum; pseudoperidiis irregulariter ruptis demum umbilicatis; sporis lævibus globosis albis (no. 495).

On leaves of *Phaseolus Grahamianus.*

Spores ·0013 in diameter.

Looks like the egg of some moth. In drying the cuticle contracts all round so as to present a radiated appearance.

859. GRAPHIOLA PHŒNICIS, *Poit.*

On *Phœnix farinosa.*

HYPHOMYCETES.

860. ISARIA AURANTIACA, *B. & Br.* Congesta, lateritio-aurantiaca, cylindrica vel compressa, subramosa, radians; sporis curvis (nos. 253, 334).

On bark and decorticated branches. Nuwara Eliya.

Bright orange, about a line high; spores ·0004 long.

Possibly the conidiiferous form of some *Sphæria.*

861. I. CONGESTA, *B. & Br.* Brevis, clavata, cinerea, e basi communi oriunda; sporis tenuibus oblongis (no. 78).

Spores ·00026 long.

Probably the conidioid state of some *Sphæria.*

362. I. CONGREGATA, *B. & Br.* Congesta, clavæformis, fusca, capitulis pallido-umbrinis; sporis elongatis, sursum obtusis, deorsum acuminatis (no. 140).

On wood. Nov. 1861.

Densely crowded; flocci towards the upper joints with the articulations deeply indented; spores ·0006 long.

Possibly a state of some *Sphæria.*

863. I. PULCHERRIMA, *B. & Br.* Alba, clavata, deorsum filiformis, villosa, e mycelio byssoideo quandoque repente oriunda, floccis fertilibus articulatis; sporis ex articulis enatis verticillatis (nos. 219, 249).

On fruit and leaves of Palms.

Sometimes scattered, sometimes crowded; spores subglobose, ·00015 long.

A very beautiful species.

864. I. ARCYRIOIDES, *B. & Br.* Stipite nigro sulcato in capitulum clavatum desinente; sporis metulæformibus angustis pallidis (no. 122).

Spores ·0005–·00075 long, one third as much broad in the centre.

865. STYLBUM RHYTIDOSPORA, *B. & Br.* Stipite albo compresso; sporis obovatis venosis magnis radiantibus (no. 1031):

On rotten wood. Peradeniya, Jan. 1869.

Spores ·0015–·002 long, ·001 wide.

Looks at first sight like a little scarlet *Nectria.* Sometimes two or more individuals are laterally confluent.

866. S. STROMATICUM, *B. Hook. Lond. Journ.* 1843, p. 642. (No. 1224.)

On bark. Below Adam's Peak, Feb. 1871.

867. S. COMPRESSUM, *B. & Br.* Congestum, albidum, stipite compresso; sporis subellipticis (no. 742).

On decaying fruit of *Citrus decumana*.

Crowded like the prickles of an *Irpex*; spores ·0002 long.

868. S. ERYTHROCEPHALUM, *Dittm.* (No. 174.)

On dung.

Spores ·00016 long. No. 158 has globose spores ·00015–·0002 in diameter; but is possibly only a variety.

869. S. BYSSIGENA, *B. & Br.*—S. byssisedum, *B. & C. Journ. Linn. Soc.* x. p. 358. (No. 123.)

On branches. Peradeniya, Dec. 1868.

Spores fusiform ·0005–·0006 long by ·0002.

870. S. CLAVULA, *B. & Br.* Clavatum, intus cellulosum, e materie nigra oriundum, sursum cinereum, deorsum nigrum; sporis oblongis obtusis (no. 150).

On bark &c. Nov, 1867.

Spores ·0005 long.

871. S. GRAPHIODEUM, *B. & Br.* Nigrum, capitulo globoso basi in stipitem contracto; sporis minutis oblongis.

872. MYROTHECIUM CARMICHAELIANUM, *Grev.* (No. 1049.)

On dead herbaceous plants. Peradeniya, Dec. 1868.

873. ANTHINA CINNABARINA, *B. & Br.* Compressa, parce ramosa, sursum sporis minutissimis albis tecta (no. 41).

Amongst fragments of plants.

Sometimes forked; a few slender threads accompany it, which are perhaps imperfectly developed conidiophora. Spores globose, too minute to measure.

874. CERATIUM ARBUSCULA, *B. & Br.* Niveum, e basi simplici fastigiato-ramosum; sporis late ellipticis (no. 159).

On very rotten wood. It occurs also in Bombay.

Quite simple below, and then fastigiate and laterally confluent; spores ·0004–·0006 long.

875. C. HYDNOIDES, *A. & S.* (Nos. 51, 141, 225.)

On rotten wood. Nuwara Eliya.

Spores ·0005 long. In other specimens ·0004–·00045.

876. C. FILIFORME, *B. & Br.* Elongatum, filiforme, tenuissimum, flexuosum (no. 584).

On rotten wood. Dolosbagey, May 1868.

Spores ·0004 long by ·0003.

877. FUSIDIUM SQUAMICOLA, *B. & Br.* Luteum, floccis erectis ramosis, sporis oblongis brevibus (no. 441).

On leaves of *Clerodendron*.

Spores ·0002–·00036 long.

It may perhaps be thought that this is a morbid state of the scales. This can be determined only on the spot; but at any rate it is worth recording.

878. F. PULVINATUM, *B. & B.* Candidum, pulvinatum, sporis cylindricis (no. 166).

On dead stems of herbaceous plants.

Spores ·0004 long.

879. F. FASCICULATUM, *B. & Br.* Album, erectum, floccis fasciculatis sæpe connatis; sporis oblongis (no. 142).

Forming little white scattered tufts on bark. Spores ·0006 long.

No. 265 is some *Fusisporium* in too bad condition to determine.

880. F. CRATÆVÆ, *B. & Br.* Niveum, minutum, floccis brevibus nodulosis; sporis clavæformibus basi attenuatis (no. 512).

On leaves of *Cratæva Roxburghii*. Peradeniya, Feb. 1868.

Spores ·002 long.

881. HELMINTHOSPORIUM CALICIOIDEUM, *B. & Br.* Cæspitosum, congestum, fastigiatum; sporis sursum truncatis, deorsum attenuatis, multiseptatis (no. 151).

On wood.

Look at first like a *Calicium*. Spores ·003–·004 long.

882. H. GIGASPORUM, *B. & Br.* Flocci simplices, obtusi; sporis maximis, hic truncatis, illic attenuatis, curvulis, apice hyalinis, multiseptatis (no. 246).

On wood.

Spores ·0045 long.

883. H. ARECÆ, *B. & Br.* Pulvinulis mollibus e fibris radiantibus; sporis magnis obovatis 3-septatis (no. 164).

Forming little patches on the leaves of *Areca Catechu*.

Spores ·002–·0023 long. Sometimes the spores are more than triseptate, when they are much attenuated below.

884. H. ATROPURPUREUM, *B. & Br.* Effusum, atropurpureum, floccis erectis apice clavulato-divisis; sporis oblongis triseptatis (no. 74).

On smooth bark. Nov. 1867.

Spores ·001–·0013 long.

885. CLADOSPORIUM CALAMIGENA, *B. & Br.* Floccis brevibus fuscis obtusis; sporis magnis metulæformibus (no. 1139).
South of island. July 1868.
Spores ·001 long.

886. C. HERBARUM, *Lk.*, var. TORULOSUM. Floccis erectis torulosis; sporis dein uniseptatis (no. 473).
On leaves of *Anamirta.*
Spores ·0003–·0005 long.

887. C. APICALE, *B. & Br.* Floccis sparsis erectis sursum attenuatis, sporis apicalibus subfusiformibus (no. 466).
On leaves of *Cycas circinalis.* Peradeniya, Jan. 1868.
Forming transverse patches. Spores ·0002–·0004 long.

888. C. SCOPÆFORME, *B. Hook. Kew Journ.* 1854, p. 208.
On leaves of *Cinnamomum zeylanicum.*
Spores ·002–0025 long.

889. C. CONGESTUM, *B. & Br.* Floccis tenuibus flexuosis; sporis oblongis curvulis trinucleatis.
On leaves of *Litzæa.*
Habit of the last.

890. MONATOSPORA ORYZÆ, *B. & Br.* Sparsa; floccis erectis rigidis flexuosis, apice breviter furcatis; sporis subglobosis.
On rice-leaves from Jaffra, *H. S. O. Russell,* Esq., Government Agent of the Northern Provinces.
Spores ·0005–·0006 long.

891. M. FUSIGERA, *B. & Br.* Floccis hyalinis, apice attenuatis; sporis fusiformibus fuscis, utrinque obtusiusculis (no. 148).
Apparently on the leaves of some Palm. Nov. 1867.
Spores ·001 long.

892. PERICONIA RIGIDA, *B. & Br.* Setiformis, e fibris plurimis compacta apice clavatis basi radiatis; sporis oblongis uniseptatis uninucleatis (no. 250).

893. P. MONILIFERA, *B. & Br.* Floccis erectis scabris; capitulo e floccis furcatis compacto; sporis concatenatis subglobosis (no. 246).
Spores ·00015–·00025 in diameter.

894. TRIPOSPORIUM GARDNERI, *B.* Olivaceum; floccis fertilibus erectis articulatis, articulis constrictis; sporis 6–8-septatis acutis, apice hyalinis.
On the underside of dead leaves. July 1848.

No. 145 is a singular fulvous mycelium consisting of erect bristle-like threads arising from more delicate creeping filaments; some of the threads bear at their tips five or more radiating setæ, some of which are occasionally forked.

895. Oidium gilvum, *B. & Br.* Placentiforme, gilvum; sporis obovatis, e pedunculo tenui moniliformiter oriundis (no. 664).

South of the island. July 1868.

Looks at first sight very like an *Hypocrea*; often crowded together, a line or more across, rather compact.

896. O. simile, *B. Hook. Lond. Journ.* 1845, p. 310. (No. 126.)

On bark. Nov. 1867.

Occurs also in Ohio, Cuba, and the Neilgherries.

897. Helicoma binale, *B. & C.* Floccis erectis, apice spora spirali terminatis.

With *Reticularia fuliginosa* (no. 247).

898. Sporodum effusum, *B. & Br.* Strato atropurpureo effuso; floccis erectis hic illic monilia solitaria vel congregata e processu laterali ferentibus (no. 245).

On petioles of fallen leaves.

Spores globose, ·002 in diameter.

899. Zygosporium oscheoides, *Mont. Cub.* p. 303. (No. 432.)

On leaves of *Pandanus odoratissimus*.

Spores ·0005 long; generally two on each process.

Pithomyces, *B. & Br.*

Flocci erecti, granulati, in massam flavam tenuem congesti; sporæ maturæ quinqueseptatæ, doliiformes (no. 1070).

900. Pithomyces flavus, *B. & Br.* (No. 1070.)

On some Monocotyledon. Peradeniya, Dec. 1868.

Forming little yellow or olive-yellow thin soft patches. Spores ·0015 long, ·001 wide in the centre.

901. Graphium curvulum, *B. & Br.* Sporis curvulis elongatis 6–7-septatis. (No. 342.)

On bark with *Thelephora pedicellata*.

902. Graphium clavisporum, *B.*

On vine-leaves.

Œdemium.

903. Œdemium sparsum, *B. & Br.* Floccis subramosis hic illic processus hyalinos sporas fusiformes gerentes emittentibus (no. 431).

On *Pandanus odoratissimus*.

Sometimes divided at the apex in a radiating manner. Spores ·001 long.

904. Pilacre depressa, *B. & Br.* Stipite brevi, basi nigricante, sursum pallido, capitulo albo depresso (no. 43).

On decayed bark and wood. Peradeniya, Nov. 1867.
Sometimes so depressed as to look like the shield of a lichen. Threads flexuous, curved at the tips; spores ·0003 long.

905. P. ORIENTALIS, *B. & Br.* Stipite cinereo; capitulis globosis albis, demum umbrinis; floccis sursum ramosis, ramis sporiferis brevibus obtusis, sporis globosis nucleatis (no. 15).
On dead wood. Peradeniya, Nov. 1867. Found also by Captain E. S. Berkeley in the Neilgherries. Spores ·00025–·0003 long.
Allied to *P. faginea*, but the flocci are very different.

906. P. TEPHROSPORA, *B. & Br.* Minor; capitulis globosis, demum brunneis; floccis subramosis; ramulis fertilibus sparsis brevibus; sporis brunneis minoribus (no. 52).
On dead leaves. Peradeniya, Nov. 1867. Found by Captain E. S. Berkeley in the Neilgherries.

907. P. SPHÆROCEPHALA, *B. & Br.* Stipite nigro, capitulo globoso umbrino, sporis globosis (no. 122).
Peradeniya. Nov. 1867.
Spores ·0003–·00035 in diam.

908. ÆGERITA CANDIDA, *P.* (Nos. 285, 349.)
On sticks &c. Central province, Dec. 1868.

909. Æ. MELLEA, *B. & Br.* Minuta, subglobosa, mellea (no. 1019).
On lichens. Peradeniya, Dec. 1868.
Small yellow tremelloid specks scarcely visible without a lens.

MUCEDINES.

910. PENICILLIUM INCARNATUM, *B. & Br.* Pulvinulis minutis pallide carneis; floccis articulatis erectis hyalinis, apice digitatis; sporis limoniformibus (no. 241).
On leaves of some Monocotyledon.
Spores ·0003 long.

911. P. ROSEUM, *Lk.*
On *Hibiscus*.

912. RHINOTRICHUM GLOBIFERUM, *B. & Br.* Aureum; floccis ramosis, parce articulatis; sporis sparsis globosis. (No. 61.)
On bark.

913. ASPERGILLUS FLAVIDUS, *B. & Br.* Flavidus; floccis granulatis inarticulatis; sporis late ellipticis (no. 244).
The flocci have little straight ramuli at the top; these, however, all rub off when the covering-glass is moved. Spores ·00025.

914. PSILONIA GILVA, *Fr.* (No. 257.)
On dead herbaceous plants.

915. P. PENICILLATA, *B. & Br.* Nivea, e communi basi penicillata, apicibus inflatis; sporis minutis (no. 225).

On leaves apparently of some Palm.

Spores ·0001 long.

Analogous to *Fusidium fasciculatum*.

916. SPOROTRICHUM LICHENICOLA, *B. & Br.* Niveum, floccis erectis furcatis acutis; sporis oblongis apicalibus (no. 430).

On lichens.

917. FUSISPORIUM PULVINATUM, *B. & Br.* Eximie pulvinatum, pallidum, tomentosum; sporis curvulis elongatis triseptatis (no. 215).

On bark. Nov. 1867.

ASCOMYCETES.

918. LEOTIA BRUNNEOLA, *B. & Br.* Fasciculata; stipitibus crassis cylindricis; pileo breviter digitaliformi, demum lobato (no. 1225 cum icone).

On the ground.

Stem $\frac{3}{4}$–1 inch high, $\frac{1}{3}$–$\frac{1}{2}$ thick; pileus $\frac{1}{3}$–1 inch wide, about $\frac{1}{4}$ high, brownish olive.

Unfortunately no specimens were preserved.

919. RHIZINA RETICULATA, *B. & Br.* E cupuliformi expansa, substipitata, subtus velutina, reticulata, brunnea; hymenio vinoso; sporidiis oblongis curvulis obtusissimis (no. 321).

On wood. Habgalla, Dec. 1867, 1868. Neilgherries, *E. S. Berkeley*.

At first obconic, then cup-shaped, at length expanded, 1–2 inches across; asci linear; paraphyses slightly clavate, sporidia ·001 long, ·0005 wide.

920. R. THWAITESII, *B. & Br.* Orbicularis, sessilis, extus velutina, fusca; hymenio pallido; sporidiis fusiformibus verruculosis (no. 1).

On twigs covered with lichen.

Closely resembling *R. spongiosa*, but not positively villous, besides having the sporidia rough and in general far less pointed.

921. PEZIZA (DISCINA) SARMENTORUM, *B. & Br.* Minor, subgelatinosa, demum explanata, extus pulverulenta; hymenio quandoque venoso; sporidiis oblongo-ellipticis lævibus (no. 3).

On petioles. Peradeniya, Nov. 1867.

Cups at length flat, rarely irregular, 2–8 lines across; sporidia ·0009 ong, ·0004 wide, even.

Var. GEOPHILA (no. 1055).

On soil. Peradeniya, Dec. 1868.

Sporidia ·0008 long, ·0004 wide.

We cannot distinguish this without fresh specimens, or notes as to the colour when fresh.

922. P. (DISCINA) EPISPARTIA, *B. & Br.* Minor, lobata, expansa, extus tomentoso-pulveracea; hymenio lævi; sporidiis minoribus lævibus; mycelio filiformi (nos. 71, 1054).

Apparently on very rotten wood. Peradeniya, Nov. 1867.

About an inch across, at first cup-shaped, soon expanded; mycelium consisting of rather thick cylindrical threads; sporidia elliptic, even, ·0003 long, ·00015 wide.

Resembling at first sight *P. sarmentorum*; but the hymenium is not wrinkled, and the sporidia are much smaller. No. 1054 is a little paler, but the fruit is the same.

923. P. (DISCINA) RADICULOSA, *B. & Br.* Minor, aurantiaca; cupulis extus luteo-pulverulentis radicantibus; sporidiis minoribus lævibus (no. 10).

On soil. Peradeniya, Nov. 1867.

Orange externally; flesh yellow; ¼–⅓ inch broad, sending down a long root or threads into the soil; sporidia elliptic, ·0003 long.

924. P. (DISCINA) LECHRIA, *B. & Br.* Minor, obliqua, extus umbrina; hymenio badio; sporidiis submetulæformibus (no. 111).

On very rotten wood. Peradeniya, Nov. 1867.

About ½ an inch high, oblique; sporidia elliptic ·0008–·0006 long, ·0003–·00025 wide, flattened at either extremity.

There is a very thin gelatinous outer coat.

925. P. (GEOPYXIS) HINDSII, *B. Hook. Lond. Journ.* 1842, p. 456. (No. 616 cum icone.)

On wood. Tropical forests south of the island, July 1868.

Sporidia even, ·0011 long, ·0005 wide.

926. P. (GEOPYXIS) TRICHOLOMA, *Mont. Ann. d. Sc. Nat.* 1834, ii. p. 77. (Nos. 617, 3.)

On bark and wood. Madamahanevera 2000 ft., Dec. 25, 1854. Central province, Dec. 1868.

Pale ochraceous, more or less deeply tinged with rose; hymenium deep rose; sporidia broadly fusiform, sometimes appendiculate, in one specimen marked with longitudinal dots like a Diatom.

927. P. (GEOPYXIS) INSITITIA, *B. & C. Un. St. Exp. Exp.* (No. 1051 cum icone.)

On wood. Peradeniya, Dec. 1868.

Straw-coloured when young, externally hairy as well as fringed; stem

hollow, wrinkled when dry; paraphyses slender, branched; sporidia obliquely fusiform, ·0015–·0018 long, ·0004–·0005 wide.

928. P. (GEOPYXIS) EMARGINATA, *B. & Br.* Aurantiaca, extus glabrescens, cupula plana; sporidiis truncatis sæpe emarginatis (no. 1052).

On the ground or on very rotten wood. Central province, Dec. 1868.

Attached to the soil for the greater part of the under surface, which is at length quite smooth and wrinkled, 1¼ inch across; sporidia oblong, ·001–·0012 long, frequently decidedly emarginate.

It has much the habit of a *Midotis*; paraphyses very slender.

929. P. (GEOPYXIS) CRENULATA, *B. & Br.* Aurantiaca, sessilis vel substipitata, basi plicata, margine crenulato; paraphysibus filiformibus; sporidiis ellipticis lævibus (no. 8).

On sticks. Peradeniya, Dec. 1868.

Sporidia ·0008 long, ·0035 wide.

930. P. (GEOPYXIS) LÆTICOLOR, *B. & Br.* Ruberrima; cupulis planis immarginatis; paraphysibus filiformibus; sporidiis late ellipticis (no. 579).

On sticks. Dolosbagey, May 1868; Peradeniya, Dec. 1868.

Sporidia ·001 long, ·0005 wide.

Looking like the apothecia of a *Lecidea* 1–2 lines broad.

931. P. (GEOPYXIS) HARMOGE, *B. & Br.* Cupula stipitata; stipite viridi-roseo; hymenio plano moricolori, carne alba (no. 1061).

On very rotten twigs. Peradeniya, Jan. 1869.

Pileus ¼ inch across; sporidia elliptic, ·001 long, ·0005 wide.

932. P. (GEOPYXIS) GRANULATA, *Bull.* (No. 9 in part.)

On dung.

Sporidia ·0008 long by ·0005 wide; in European specimens ·0006.

933. P. (HUMARIA) FLAVOTINGENS, *B. & Br.* Gregaria, substipitata, e mycelio floccoso oriunda, cupulæformis, pulvere flavo sparsa; ascis brevibus; sporidiis ellipticis (no. 7).

Amongst fragments of herbs which are bound together by the mycelium. Peradeniya, Nov. 1867.

Fruit scarcely mature.

934. P. (HUMARIA) RUBERRIMA, *B. & Br.* Hemisphærica, ruberrima, margine incurvo nec revoluto; sporidiis minoribus breviter ellipticis brevibus (no. 18).

On dead wood. Peradeniya, Nov. 1867.

Sporidia ·0002 long.

A very neat species, but losing its colour in drying.

935. P. (HUMARIA) USTORUM, B. & *Br.* Cupulis concavis, extus fuscis rugulosis; hymenio coccineo; sporidiis ellipticis obtusissimis 1–2-nucleatis (no. 279).

On burnt earth. Habgalla.

Sporidia ·0005–·0007 long.

936. P. (HUMARIA) MELALOMA, *A.* & *S.* (No. 279 in part.)

On burnt earth.

Sporidia ·00025.

937. P. (HUMARIA) GLOBIFERA, *B.* & *C. Journ. Linn. Soc.* x. p. 366. (No. 1060.)

On sandy soil. Central province, Dec. 1868.

938. P. (SARCOSCYPHÆ) HIRTA, *Schum.* (Nos. 2, 273, in part.)

On bark, dead wood &c. Central province, Dec. 1868; Peradeniya; Nuwara Eliya.

Sporidia ·0007–·0008 long by ·0005.

Differs clearly from *P. scutellata* in the very strongly echinulate sporidia.

939. P. (SARCOSCYPHÆ) VERRUCULOSA, *B.* & *Br.* Ascis linearibus; sporidiis uniseriatis globosis fortiter verruculosis, paraphysibus linearibus intus globulis repletis; cætera *P. hirtæ.*

940. P. (ENCŒLIUM) RUSSA, *B.* & *Br.* Cupulis subcoriaceis rugulosis granulatis vivide rubro-brunneis, margine appendiculis moniliformibus ornato (no. 1064).

On bark. Central province, Dec. 1868.

Sporidia sausage-shaped, ·0003 long; asci ·002.

941. P. (DASYSCYPHÆ) SIMILLIMA, *B.* & *Br.* Cupulis brevissime stipitatis, primum globosis, demum hemisphæricis, albo-tomentosis; hymenio concavo aurantiaco; ascis clavatis; sporidiis filiformibus (nos. 11, 57).

On bark and twigs.

Sporidia ·004–·0045 long.

No. 11 has rather shorter sporidia; both closely resemble *P. bicolor.*

942. P. (DASYSCYPHÆ) ONCOSPERMATIS, *B.* & *Br.* Cupulis breviter stipitatis cyathiformibus tomentosis luteis; sporidiis fusiformibus angustis (no. 435).

On *Oncosperma fasciculatum,* Thw. Habgalla, Dec. 1867.

Minute, scattered, pale yellow; sporidia fusiform, sharply pointed, thicker at one end, ·0008-·001 long; cups ·012 high.

943. P. (DASYSCYPHÆ) EAROLEUCA, *B.* & *Br.* Sessilis, e globoso

aperta, extus villosa, nivea; disco carneo, demum convexo; sporidiis minimis oblongis (no. 107).

On herbaceous stems, sticks, and wood.

Minute, gregarious; asci clavate; sporidia ·00015 long.

No. 1063 seems to be a form of the same species.

944. P. (DASYSCYPHÆ) DORCAS, *B. & Br.* Sessilis, globosa, aperta, extus cervina tomentosa; hymenio fusco; sporidiis subellipticis, medio constrictis, biseriatis uniseptatis binucleatis (no. 275).

On some monocotyledonous plant.

Scattered over the bark, looking at first much like a villous *Sphæria*. Sporidia ·0005 long.

945. P. (DASYSCYPHÆ) ATRO-CITRINA, *B. & Br.* Sessilis, subhemisphærica, extus floccis citrinis villosa; hymenio atro; sporidiis clavatis septatis (no. 274).

On dead wood.

Sporidia ·0018–·002 long.

Resembling *P. variecolor*; but that has different fruit and a pale disk; flocci granulated.

946. P. (DASYSCYPHÆ) FLAMMEA, *A. & S.* (No. 1065.)

On wood. Peradeniya, Jan. 1869.

947. P. (DASYSCYPHÆ) HYSTERIGENA, *B. & Br.* E cupiliformi applanata, margine inflexo, extus albida furfuraceo-tomentosa; hymenio cinereo; ascis clavatis; sporidiis minutis globosis (no. 1067).

Parasitic on *Hysteria*. Central province, Dec. 1868.

Sporidia ·00015 in diameter.

948. P. (DASYSCYPHÆ) CÆSIO-LUTEA, *B. & Br.* Sessilis, sæpe congesta, crispata, e strato tenui nigro oriunda, extus cæruleo-tomentosa; hymenio flavo (no. 1053).

On bark. Central province, Dec. 1868.

Asci clavate, ·001 long; sporidia minute, uniseriate, ·0002 long.

Allied to *P. Godroniana*, Mont., which is the same as *P. tricolor*, Sow.

949. P. (DASYSCYPHÆ) HYALINA, *P.* (No. 285 in part.)

On dead wood with *Æquita candida*.

950. P. (TAPESIA) MELANERES, *B. & Br.* Cupulis subglobosis albidis subtiliter pulverulentis, e strato tenui byssoideo oriundis; hymenio concavo cinereo; sporidiis breviter fusiformibus uniseptatis (no. 283).

On dead sticks.

Asci clavate; sporidia ·0008 long.

Peziza pruinata, Schwein. (no. 488), is an *Arthonia*.

951. P. (MOLLISIA) APICALIS, *B. & Br.* Pallide aurantiaca, congesta,

subglobosa, margine incurvo, extus pulverulenta; ascis clavatis; sporidiis minimis subglobosis (no. 1219).

At the tips of the shoots of *Macromitrium sulcatum*, Brid.

Extremely minute, just visible to the naked eye from several individuals being crowded together; walls of cup composed of longitudinal narrow cells; sporidia ·00015 long.

952. P. (MOLLISIA) VULGARIS, *Fr.* (Nos. 65 in part, 286.)

On dead wood and bark. Nuwara Eliya.

953. P. (MOLLISIA) VINOSA, *A. & S.* (Nos. 65 in part, 827.)

On dead wood and bark.

Asci clavate ·0012 long; sporidia fusiform, slightly curved, ·0003–·0004 long.

Two forms occur—one scattered, the other crowded and with radiating white threads at the base.

954. P. (MOLLISIA) ALLIGATA, *B. & Br.* Sparsa vel congesta, subtus albo-pulverulenta, flexuosa; hymenio melleo; paraphysibus apice curvatis; sporidiis uniseriatis ellipticis (no. 112).

On dead leaves, to which it is closely adpressed. Peradeniya, Nov. 1867.

Asci clavate, sporidia ·0006 long.

955. P. (MOLLISIA) CINEREA, *Batsch.* (No. 281.)

On dead wood.

Spores oblong, ·00035 long.

956. HELOTIUM ALUTACEUM, *B. & Br.* Sessile, subtus margineque albidum, flexuosum, pulverulentum; hymenio alutaceo; sporidiis ellipticis (no. 65).

Peradeniya, Nov. 1867.

Margin at first inflexed; sporidia ·0005 long.

957. H. MELLEUM, *B. & Br.* Punctiforme, gelatinosum, convexum, pallide melleum; sporidiis ellipticis (no. 1127).

On bark. Peradeniya, Jan. 1869.

Scattered or fasciculate, minute, at first flattened, then convex, without any distinct stem; asci clavate, sporidia ·0008 long.

958. H. FASCICULARE, *B. & Br.* Fasciculare, obconico-stipitatum, pallidum; hymenio convexo; ascis linearibus; sporidiis subglobosis (no. 1133).

On bark. Peradeniya. Dec. 1868.

Sporidia ·0003 long.

959. H. AGARICICOLA, *B, & Br.* Cupulis breviter stipitatis, extus pul-

verulentis; hymenio vinoso; sporidiis uniseriatis cymbiformibus pallide fuscis (no. 13).

On decaying Agarics. Peradeniya, Nov. 1867.

960. H. PALLESCENS, *Fr.* (No. 284.)

On *Hypoxyla.* Nuwara Eliya.

961. H. LENTUM, *B. & Br.* Stipite cylindrico nigro, cupula extus rugosa; hymenio siccatione rufo, madido lutescente; sporidiis brevibus acicularibus (no. 104).

On dead leaves, capsules, &c. Nov. 1867.

Sporidia ·00025–·0003 long.

962. H. RUFO-CORNEUM, *B. & Br.* Stipite brevi, sursum dilatato; cupulis subtus rugosis castaneis; hymenio concolori; paraphysibus clavatis; sporidiis fusiformibus, apicibus auctis hyalinis (no. 282).

On dead wood.

Sporidia ·0013 long.

HÆMATOMYCES.

Tremelloides, sinuato-lobatus, gyrosus, subcerebrinus, immarginatus; asci vesiculares; sporidia elliptica.

963. HÆMATOMYCES SPADICEUS, *B. & Br.* (No. 59.)

On dead wood.

Looks exactly like a *Tremella*; sporidia ·00025 long, bearing a small proportion to the wide obovate vesicular asci.

There can be no doubt that the genus is good; but it is to be hoped that a further supply of specimens will be procured. The asci are quite unlike any thing in *Bulgaria*, to which we were at first inclined to refer it. Black when dry.

964. PATELLARIA VIOLACEA, *B. & Br.* Sessilis, applanata, margine incurvo crenato, violacea; sporidiis cymbiformibus (no. 109 in part).

On dead wood.

Sporidia ·0005 long.

965. P. HIRNEOLA, *B. & Br.* Sessilis, applanata, extus velutina; hymenio gilvo; sporidiis ellipticis lævibus (no. 109 in part).

On an old *Polyporus.*

Sporidia ·0004 long.

966. P. VIRIDI-RUFA, *B. & Br.* Subhemisphærica, extus rufa striata; hymenio griseo-viridi; sporidiis fusiformibus brevibus angustis (no. 102 in part).

Sporidia ·004 long.

967. P. APPLANATA, *B. & C.* Adpressa expansa, margine incurvo

extus rubiginosa; hymenio fusco; sporidiis subellipticis binucleatis (no. 12).

On dead wood. Peradeniya, Dec. 1868.

Sporidia ·0004 long, ·0002 wide; in United-States specimen, ·0004, ·0003.

968. P. STICTIOIDES, *B. & Br.* Irregularis, tenuis, expansa, lobata, extus nigra; hymenio luteo-olivaceo; sporidiis minimis.

Looks like a small *Stictis*.

969. CENANGIUM PULVERACEUM, *Fr.*, var. (No. 428.)

On bark. Peradeniya, Dec. 1867.

Asci clavate; sporidia sausage-shaped, ·0002 long.

970. ASCOBOLUS THWAITESII, *B. & Br.* Carneus; extus albo-furfuraceus; sporidiis ellipticis echinulatis (no. 1059).

On rotten wood. Central province, Dec. 1868.

Sporidia ·001 by ·0005.

Differs materially from *A. lignatilis*.

971. A. LEIOCARPUS, *B. & Br.* Cupulis extus rubiginosis furfuraceis; hymenio fusco; sporidiis ellipticis lævibus (no. 56).

On dung. Peradeniya.

Sporidia ·001 long, even, with the exception of very faint lines.

972. A. FOLIICOLA, *B. & Br.* Cupulis extus luteo-ferrugineis; hymenio demum undulato spadiceo; sporidiis pallide lilacinis longitudinaliter rugosis (no. 14).

On dead leaves. Nov. 1867.

The cuticle of the sporidia at length breaks up into minute globules.

973. STICTIS * RADIATA, *P.* (No. 318.)

On dead branches of *Citrus decumana*. Peradeniya, 1868.

* The following species oscillate between *Stictis* and *Arthonia* or *Platygrapha*, to which latter genus they are referred on account of their habit.

a. PLATYGRAPHA BIVELA, *B. & Br.* Hymenio griseo, velo marginali corticeque substellato cincto; ascis clavatis; sporidiis obovatis, deorsum attenuatis, 5–7-septatis (no. 634).

On bark.

Sporidia ·0006–·0008 long, ·0003 wide, pale brown, with greenish endochrome.

b. P. ASTROIDEA, *B. & Br.* Minuta; hymenio glauco, margine stellato-fracto; sporidiis clavato-fusciformibus 5-septatis (no. 629).

On bark. Tropical forests south of the island, July 1868.

Agrees in fruit with the last, but a very different-looking species.

c. P. SUBRETICULATA, *B. & Br.* Cupulis aggregatis, quandoque maculas reti-

974. HYDNOCYSTIS THWAITESII, *B. & Br.* Ochracea, globosa, inflata, demum plicata, ore parvo aperta, extus glaberrima; sporidiis ellipticis (no. 1056).

On the ground. Peradeniya, Dec. 1868.

Sometimes seated on a tomentose stratum; ½–1 inch across; sporidia ·001 by ·0005.

975. TUBER ZEYLANICUM, *B. & Br.* Minutum, luteum rugosum, centro affixum (no. 1013).

On a piece of dead stick. Peradeniya, Dec.

Only a single specimen found, 1½ line across, unfortunately without perfect fruit. No. 1093 is in the same condition.

SPHÆRIACEI.

976. CORDICEPS MILITARIS, *Fr.* (No. 341.)

On dead pupæ. Nuwara Eliya; Central province, 1868.

Bright crimson, varying much in size.

977. C. BARNESII, *Thw.* Stipite cylindrico velutino; clavula cylindrica, apice sterili; conidiiophoris ramosis stilboideis candidis, capitulis globosis (no. 1120 cum icone).

On larvæ of *Melolontha.*

Conidia ·0001 long.

978. C. SOBOLIFERA, *B. Hook. Lond. Journ.* 1843, p. 207 (*sub* Sphæria). *Torrubia sobolifera,* Tul. Sel. Fung. Carp. iii. p. 10.

On larvæ of some lamellicorn insect at the roots of coffee-trees. Bolagodde.

---

culatas formantibus, margine crenato niveo tomentoso; ascis subclavatis; sporidiis oblongis, extus hyalinis 3-septatis (no. 628).

On bark. Tropical forests south of the island. July 1868.

Sporidia ·0005 long by ·00025, brown, with a greenish endochrome.

No. 630, from the same locality, is a variety with scattered cups.

d. P. ALBO-RUFA, *B. & Br.* Hymenio lato rufo, margine albo crenato; sporidiis subfusiformibus 5-septatis, ascis clavatis (no. 69).

On bark. Peradeniya, Nov. 1867.

e. P. MAGNIFICA, *B. & Br.* Hymenio croceo-lateritio, cuticula elevata rigida cincto, pulverulento; sporidiis sigmoideis multiseptatis, articulis constrictis (no. 624).

On sticks. Tropical forests south of the island. July 1868.

Sporidia ·004–·0045 long, ·0005–·0007 wide, ultimately breaking up into elliptic disks.

The magnificent sporidia remind one of those of *Lichenopsis sphæroboloides,* Schwein.

979. C. MYRMECOPHILA, *Cés.* (*sub* Hypocrea); *Rab.* (no. 1033). Ochroleuca; stipite filiformi tenacello; clavula ovoidea ad basin sterili, superne costata acutiuscula, e peritheciorum summo ostiolo, gibberulosa (no. 1218 cum icone).

On dead ants.

980. C. DIPTERIGENA, *B. & Br.* Pallida, stipite cylindrico; capite globoso; ostiolis inconspicuis.

Sep. 1864.

About 1½ inch high.

Under no. 619 is some *Spermædia* on *Fimbristylis* from the south of the island, July 1868. The resulting *Cordiceps* has not yet been detected.

981. EPICHLOE PULVINULUS, *B. & Br.* Brevis, aurantiaca, pulvinata, ostiolis depressis (no. 1099).

On some species of *Panicum*. Peradeniya, Dec. 1868.

Forming little cushions, 1–2 lines long, confined to one side, but springing from the same sort of mycelium as *E. typhina*; asci linear, waved; sporidia with short articulation.

982. E. CINEREA, *B. & Br.* Cylindrica, cinerea; sporis longis filiformibus (no. 504).

On *Eragrostis nutans*. March 6, 1868.

983. HYPOCREA ARTOCREAS, *B. & Br.* Hemisphærica, late affixa, subtus tomentosa albida, supra plana jecorina rugosiuscula, primum pulverulenta (no. 110).

Apparently on petioles of some palms. Nov. 1868.

Sporidia not mature.

984. H. DISCELLA, *B. & Br.* Pallide rufa, orbicularis, applanata, supra rugosa punctata; sporidiis minoribus (no. 5 in part).

On dead wood.

Asci linear; sporidia ·0001 long.

985. H. DEPLANATA, *B. & Br.* Cremoricolor, adnata, margine brevi albo byssoideo; ostiolis impressis lætioribus (no. 1100).

Central province, Dec. 1868.

Sporidia 16, globose, forming a necklace ·0002 in diameter.

986. H. CORTICIOIDES, *B. & Br.* Effusa, olivacea, margine brevi byssoideo; peritheciis nunc immersis, nunc liberis collapsis; sporidiis ellipticis obtusis apiculatis uniseptatis (no. 645).

On bark. South of the island, July 1868.

Sporidia ·0002–·00025 long.

987. H. SACCHARINA, *B. & C. Journ. Linn. Soc.* x. p. 376.

Var. AGARICUCOLA (no. 113) peritheciis magis prominulis; junior pallida.

On stems of decayed Agarics.

Sporidia immature.

988. H. PEZIZOIDES, *B. & Br.* Orbicularis, undulata, aurantiaca, centro affixa, subtus pallida, carne alba; sporidiis globosis (no. 308).

Central province.

At first looking like a *Midotis* or the apothecia of some Lichen, more or less margined, then expanded, $\frac{1}{4}$–$\frac{3}{4}$ inch across; sporidia ·00015–·00025 in diameter.

989. H. JECORINA, *B. & Br.* Convexa, pulvinata, jecorina, demum subplicata; ostiolis prominulis; carne alba (nos. 33, 1097).

On bark and wood. Nuwara Eliya, Central province, Dec. 1868.

Sporidia ·00015–·0002 in diameter, forming a necklace.

990. H. CATOPTRON, *B. & Br.* Minor, mellea; peritheciis nigris, demum perlucentibus (nos. 5 in part, 557).

On bark and dead wood. Central province, Feb. 1865; Dolosbagey.

Sporidia ·00025–·0002.

991. H. RUFA, *Fr.* (No. 558.)

On dead wood. Central province, Feb. 1868.

Sporidia ·0002 in diameter.

Nos. 167, 235, are a conidiiferous state of this or some other allied species, *Trichoderma viride.*

992. H. LENTA, *Fr.* (No. 1098.)

On dead wood. Central province, Dec. 1868.

993. H. FUSIGERA, *B. & Br.* Effusa, tuberculata, pallida, tomentosa, ostiolis fulvis; ascis lanceolatis, sporidiis fusiformibus uniseptatis (no. 44).

On leaves of some Monocotyledon. Peradeniya, Nov. 1867.

Sporidia ·003 long.

This species approaches *Nectria.* Perithecia sometimes immersed, sometimes prominent.

994. H. PALMICOLA, *B. & C.* Hemisphærica, luride rufa; sporidiis globosis 16 (no. 42).

On leaves of palms. Nov. 1867.

995. H. MULTIFORMIS, *B. & Br.* Pulvinata, umbrinella, ostiolis punctiformibus; peritheciis immersis vel prominulis; sporidiis moniliformibus (nos. 1094, 1095, 1096, no. 33 in part).

On dead wood and bark.

Sporidia ·00015 in diameter.

There are slight differences in the specimens; but the fruit agrees in all. No. 1095 is darker.

996. H. ALBO-FULVA, *B. & Br.* Subtus subbyssoidea, supra pallida, peritheciis fulvis notata; sporidiis globosis (no. 5 in part).

On twigs. Nuwara Eliya.

Sporidia ·0002 in diameter.

997. H. CITRINA, *Fr.* (Nos. 5 and 1094 in part.)

On wood &c. Peradeniya.

No. 108 is another *Hypocrea*, but not perfect enough to name.

998. H. DISCOIDEA, *B. & Br.* Orbicularis, placentiformis, secernibilis, coccinea, peritheciis prominulis; ascis clavatis; sporidiis filiformibus.

On leaves of *Zingiber*.

Sporidia ·004 long, obscurely multinucleate.

999. H. BAMBUSÆ, *B. & Br.* Placentiformis, fusca, granulata, ascis linearibus; sporidiis filiformibus.

On inflorescence of *Bambusa*. Jan. 1855.

Inner membrane of asci capitate.

1000. HYPHOMYCES PÆONIUS, *B. & Br.* Late effusus, nitide roseus; ascis clavatis; sporidiis oblongis subcymbiformibus, utrinque obtusis, uniseptatis (no. 127).

On Polypori.

Sporidia, ·0012, longer than in *Nectria Bloxami*; asci different; threads bearing conidia ·0005–·0008 long resemble those of *H. rosella*, Tul.

1001. H. CHRYSOSTOMUS, *B. & Br.* Peritheciis ovatis niveis e mycelio villoso parco niveo oriundis, ostiolo magno luteo; ascis linearibus; sporidiis curvulis, utrinque attenuatis (no. 1121).

Parasitic on a feathery brown mycelium. Central province, Dec. 1868.

Asci ·0035 long; sporidia ·0004–·0005. Elliptic bodies on mycelium ·0004 long by ·00025.

1002. H. CHROMATICUS, *B. & Br.* Mycelio tenui subpulverulento vivide aurantiaco; peritheciis minimis collapsis; ascis linearibus; sporidiis subcymbiformibus uniseptatis (no. 1101).

Apparently on some decayed *Stereum*. Jan. 1869.

Sporidia ·0006 long, ·0002 wide.

1003. H. STILBIGER, *B. & Br.* Peritheciis obovatis acutis; ascis elongatis, membrana interiore capitata; sporidiis fusiformibus multiseptatis, conidiiferis stilbiformibus (no. 83 bis).

On *Trichia*.

Sporidia ·006 long, ·0005 wide; conidia ·0003–·0004 long.

It is very interesting to ascertain that *Stilbum tomentosum*, Schrad., is merely a conidiophore of a *Hyphomyces* parasitic on *Trichiæ*.

1004. SPHÆROSTILBE PSEUDOTRICHIA, *Schwein.* (*sub* Sphæria).—Nectria, *B. & C. Journ. Ac. Nat. Sc. Phil.* ii. 1853, p. 289, tab. 25. f. 9. Peritheciis globosis, demum collapsis, apotheciiformibus, lateritiis, glabris; sporidiis cellulosis (no. 28, 48).

On bark.

Sporidia ·001–·0015 when mature, stylospores ·0007, conidia of stilbiform processes ·0002 long; fusiform conidia ·0003 long, slightly curved.

1005. S. REPENS, *B. & Br.* Peritheciis cæspitosis coccineis ostiolo papillæformi; sporidiis uniseptatis; conidiophoris repentibus, stipite tomentoso; conidiis obovatis basi apiculatis (no. 54).

On decaying wood of *Artocarpus integrifolia*. Peradeniya, August.

Sporidia ·0008 long, ·0004 wide, conidia ·0006–·00065 long.

1006. S. VARIABILIS, *B. & Br.* Effusa, carnea, quandoque tenuis, quandoque placentæformis; peritheciis liberis collapsis vel eminentibus; ascis linearibus; sporidiis ellipticis utrinque leviter apiculatis uniseptatis (no. 645).

On bark. Central province and south of the island, 1868.

Accompanied by strap-shaped bodies of the same colour, which occasionally bear a head of conidia; sporidia ·0005–·0006 long, ·0003 wide.

Some of the specimens closely resemble an *Hypocrea*; but these have the same conidiiferous processes.

1007. NECTRIA MONILIFERA, *B. & Br.* Peritheciis ovatis coccineis ostiolo fusco; ascis linearibus; sporidiis globosis leviter granulatis (no. 1105).

Apparently on soil or very rotten wood stained with soil. Peradeniya.

Sporidia ·0015–·0002 in diameter, forming a necklace.

1008. N. FLAVO-LANATA, *B. & Br.* Peritheciis primum villo flavo lanatis, e floccis erectis apice granulatis, conidiophoris; ascis clavatis; sporidiis uniseptatis (nos. 239 *b*, 1103).

On bark. Central province.

The flocci of the indumentum are of two kinds—the one slender, clavate, inarticulate, bearing oblong, sometimes uniseptate, conidia ·0003 long; others are thicker and articulated, with clavate granulated apices and

a ring of granules, some oblong triseptate, ·001 long, others fusiform, ·0025 long, besides which there are sometimes curved rough hairs; sporidia ·0005–·0006 long, ·00025 wide.

1009. N. COCCINEA, *Fr.* (No. 48 in part.)
On bark &c.

1010. N. BACTRIDIOIDES, *B. & Br.* Cæspitosa, minutissima; peritheciis ovatis in pulvinulo sitis; sporidiis metulæformibus uniseptatis (no. 58).
Nov. 1867.
Looks like a *Bactridium*; perithecia scarcely visible without a lens; sporidia ·0005 long, ·00025 wide.

1011. N. STENOSPORA, *B. & Br.* Cæspitosa, e matrice alba oriunda; peritheciis minutis pellucido-coccineis collapsis; sporidiis angustis uniseptatis (no. 647 in part).
On soft decaying stems. South of island, July 1868.
Sporidia ·0004–·0005 long, ·0001–·00015 wide.

1012. N. VILLIGERA, *B. & Br.* Conglomerata; peritheciis ovatis rugosis pallidis; floccis conidiiferis conidiis longiseptatis magnis ellipticis vel obovatis (no. 156).
Apparently on some decaying fungus. Nov. 1867.
Surface of perithecia rough.

1013. N. VOLUTELLA, *B. & Br.* Carneo-pallida, ostiolo obscuriore, setis pallidis ornata; sporidiis fusiformibus, uno latere ventricosis, biseptatis (nos. 445, 448).
On leaves of *Atalanta monophylla* on a lichenoid hispid white crust.
Looks at first sight just like a *Volutella*; sporidia ·0015 long.

1014. N. TRICHOSPORA, *B. & Br.* Peritheciis ovatis elongatis asperis coccineis; ascis clavatis, sporidiis fusiformibus longissimis multiseptatis (nos. 29 and 647 in part).
Sporidia ·0085 long.
A very curious species.

1015. N. BAMBUSÆ, *B. & Br.* Sparsa, pallide aurantiaco-rubra, conica acuta, glaberrima; ascis brevibus clavatis; sporidiis minimis (nos. 29, 64, 647 in part).
On Bamboo.
Sporidia ·0004 long.

1016. N. PEZIZA, *Fr.* (No. 29 in part.)
On bark &c.

1017. N. SANGUINEA, *Fr.* (Nos. 647 and 29 in part.)
On dead wood &c.

1018. N. HÆMATOCOCCA, *B. & Br.* Minuta, conferta, rugosa, coccinea, dein irregulariter vel cupulari-collapsa; sporidiis uniseptatis (no. 1104, no. 29 in part).

On bark &c. Central province.

Sporidia ·0005–·0006.

1019. N. FULIGINOSA, *B. & Br.* Conferta; peritheciis fuligineis varie collapsis lævibus; sporidiis metulæformibus uniseptatis (no. 146).

Nov. 1867.

Sporidia ·0006–·0007 long.

1020. N. SUFFULTA, *B. & C. Journ. Linn. Soc.* x. p. 378. (Nos. 1106, 1107.)

Central province.

Sporidia ·0004–·0005 long, ·0003 wide.

1021. N. PULCHERRIMA, *B. & Br.* Cæspitosa; peritheciis lentis furfuraceis coccineis ostiolo papillæformi; sporidiis biseriatis fusiformibus quadrinucleatis (no. 1102).

On bark.

1022. N. CINNABARINA, *Fr.* (No. 1102 in part.)

On bark.

With the last.

1023. N. BICOLOR, *B. & Br.* Cæspitosa, pallide coccinea vel ochracea, lævis; sporidiis minoribus oblongo-ellipticis uniseptatis (no. 647 in part).

On bark.

Sporidia ·00035 long, ·0001 broad.

1024. N. RIGIDIUSCULA, *B. & Br.* Cæspitosa; peritheciis ovatis pallide coccineis vix collabentibus; sporidiis submetulæformibus quadrinucleatis, demum 3-septatis (no. 173 *c*).

On bark.

Allied to *N. ochraceo-pallida*, but of a very different colour and appearance. Sporidia ·001 long.

1025. N. BYSSICOLA, *B. & Br.* Cæspitosa, pallide aurantiaca, e strato tenui byssoideo oriunda; peritheciis furfuraceis collabentibus; sporidiis angustis uniseptatis (no. 173 *d*).

On bark.

Sporidia ·0005 long, ·00016–·00012 wide.

1026. N. SUBQUATERNATA, *B. & Br.* Subcæspitosa; peritheciis pallidis opacis; sporidiis oblongis submetulæformibus uniseptatis (no. 173 *a*).

On bark.

Often four or five together, with a depression in the centre; sporidia ·0005 long.

1027. N. PITYRODES, *Mont. Syll.* p. 224 (no 173*b*).
Var. *saccharina* (no 29 in part).
On bark. Nov. 1867.

Resembling a pale form of *N. cinnabarina*, but with longer different-shaped sporidia. Cæspitose, pale orange, furfuraceous, at length collapsed, ostiolum dimpled, sporidia cymbiform, uniseptate, ·001–·0016 long. No. 255 is the stylosporous form of some *Nectria*.

1028. N. AURANTIICOLA, *B. & Br.* Peritheciis aurantiacis in stromate erecto sitis; ascis clavatis; sporidiis ellipticis uniseptatis, sporisque fusuloideis (no. 190).
On orange-twigs.
Sporidia ·0006 long, ·0003 wide; spores fusiform, curved, multiseptate, ·0037 long; others triseptate and strongly curved, ·0008 long.
Apparently growing from some Coccus.

1029. N. DEALBATA, *B. & Br.* Cæspitosa; peritheciis carneis, materie alba velatis, collabentibus; ascis linearibus; sporidiis oblongis ellipticis uniseptatis (no. 646).
On bark &c. South of the island.
Sporidia ·0005–·00053 by ·0002–·00025.

1030. XYLARIA POLYMORPHA, *Grev.*; *Gardn.* (no. 42).
On dead wood buried in the ground. Peradeniya, June 1844.

1031. X. DIGITATA, *Grev.* (Nos. 1112, 580, 582.)
On dead wood. Central province, 1868. Dolosbagey, May 1868.
Small form from the same locality.

1032. X. INVOLUTA, *Kl.*
On dead wood. 4000–5000 feet. 1867.

1033. X. TABACINA, *Kichx.* (No. 643 in part.)
On dead wood. Peradeniya.
Sporidia ·0004 long, ·0002 wide.

1034. X. ALLANTOIDEA, *Kl.* (No. 1113.)
On dead wood. Central province, Dec. 1868.

1035. X. HÆMORHOIDALIS, *B. & Br.* (No. 31 in part.) Subglobosa vel oblonga obtusissima, sessilis, rugosiuscula.
On dead wood.
No. 66 is probably the conidiiferous state of this species or

X. anisopleura, Mont. The stem is naked below, much branched above, and bearing abundant nearly globose conidia ·0002 in diameter.

1036. X. PYRAMIDATA, *B. & Br.* Stipite elongato, deorsum attenuato; capitulo hemisphærico sublentiformi, subtus striato; peritheciis prominentibus (no. 1117).

On dead wood. Kandy, Nov. 1868.

Stem 1½ inch high, ½ line thick; head 2½ lines across; perithecia projecting, so as to form little pyramidal excrescences; sporidia ·0002 long, oblique.

1037. X. SCHWEINITZII, *B. & C. Journ. Ac. Nat. Sci. Phil.* ii. 1853, p. 284. (No. 642 in part.)

On wood. South of the island.

Sporidia ·0013 long.

Sometimes scarcely so distinctly stipitate as in Schweinitz's original specimens from Surinam.

1038. X. GARDNERI, *B.* Stipite elongato ramoso radicante; capitulis cylindricis, primum dealbatis rugosis; ostiolis papillæformibus, demum nigricantibus (no. 186). *Gardn.* (no. 114).

On dead wood. Nov. 1867.

From 3–5 inches high; the root sometimes as long; head 2–4 inches; sporidia broadly cymbiform, ·0002 long, ·00015 broad; conidia oblong, ·0002 long.

The conidiiferous individuals are acicular and much narrower.

1039. X. ZELANICA, *B. Hook. Lond. Journ.* 1847, p. 315 (*sub* Sphæria).

On dead wood. Ambagamoa, Feb. 1846, *Gardner*.

1040. X. SPATHULATA, *B. & Br.* Capitulo lato obovato castaneo ostiolis nigris punctato; stipite brevi brunneo basi penetrante materie fusca spongiosa prædito; carne pallida; sporidiis minutis (no. 1114).

On dead wood. Central province, 1868.

Stem ¾ inch high; head the same; as in *Spathularia*, the fructifying surface runs partially down the stem; sporidia ·0004 long.

1041. X. FLABELLIFORMIS, *Schwein.* (*sub* Sphæria), *Syn. North Am. Fung.* p. 189. (No. 79.)

On dead wood. Nov. 1867.

The young state only.

1042. X. RHOPALOIDES, *Mont. Ann. Sc. Nat.* 1840, xiii. p. 27 (*sub* Sphæria). (No. 581.)

On dead wood. Dolosbagey, May 1868, taller; Central province, Dec. 1868.

1043. X. EXALBATA, *B. & Br.* Stipite cylindrico nitido; capitulo clavato niveo ostiolis nigris punctato, demum nudo nitido (no. 643 in part).

On dead wood. Central province, Dec. 1868.

About 2 inches high, ¼ inch thick; stem nearly as long as the head.

1044. X. ANISOPLEURA, *Mont.* (*sub* Sphæria), *Ann. Sc. Nat.* 1845, iii. p. 43. (Nos. 31 in part, 66.)

On dead wood. Peradeniya, Nov. 1857; also central and southern parts of the island.

Conidia globose, ·0002 in diameter.

The conidiiferous specimens presumed to belong to this species are much branched and subdivided. Sporidia ·0012 long.

1045. X. CARPOPHILA, *Fr.* (No. 615.)

On seeds of *Goniothalamus Hookeri.* Tropical forests, July 1868. Also on *Diospyros Ebenum.*

1046. X. HYPOXYLON, *Grev.* (No. 343.) No. 1115, var. MUCRONATA.

On dead wood.

Sporidia in no. 1115 ·0006 long by ·0003.

1047. X. CULLENIÆ, *B. & Br.* Stipite elongato strigoso quandoque furcato; capitulo cylindrico simplici vel fasciculato-partito; peritheciis prominulis rugosis; sporidiis cymbiformibus curvulis (no. 640).

On prickly capsules of *Cullenia excelsa.* July 1868.

Hairs of stem septate.

1048. X. TENTACULATA, *Rav. Journ. of Linn. Soc.* x. p. 381. (No. 576.)

Conidia elliptic, ·0002 long.

Exactly Cuba no. 603.

1049. X. SCOPÆFORMIS, *Mont.* (No. 613.)

On dead branches.

Sporidia ·0004 long.

Nos. 66, 72, 176, 341, 345, 554, 595, 641, 737, 1116, 1119 are all conidiiferous forms of unknown species or young conditions. Nos. 554, 176 occur on the nest of Termites when exposed to the light. No. 641 seems to be the conidiiferous state of 1119, which, however, is without fruit.

1050. USTULINA VULGARIS, *Tul.* (Nos. 333, 644.)—Sphæria deusta *auct.*

On dead wood. Peradeniya, July 1868; central province and south of the island.

Sporidia ·0015 long, ·0004 wide.

1051. HYPOXYLON CŒNOPUS, *Mont. Cub.* p. 341, var. APODA, (No. 60.)

On dead wood.

Sporidia ·0004 long

1052. H. CLAVUS, *Fr.* (*sub* Sphæria), *Linn.* v. p. 543. (No. 581.)

On dead wood. 1851.

1053. H. MICROPUS, *Fr. l. c.* p. 542. (No. 60.)

On dead wood. Peradeniya, Dec. 1868.

Sporidia slightly curved, ·0012 long.

1054. H. CONGESTUM, *B. & Br.* In glebas elevatas multipartitas congestum; peritheciis in stromate viridi sitis; sporis subglobosis (no. 637).

On dead wood.

Sporidia ·0005–·0007 in diameter, resembling those of *Nummularia.*

1055. H. CONCENTRICUM, *Grev.* (no. 187); *Gardn.* (no. 85).

On dead wood, trunks of trees, &c. Nov. 1867.

1056. H. COMPUNCTUM, *Jungh. Procem. in Fl. Crypt. Javæ*, p. 21 (*sub* Sphæria). (No. 1118.)

On dead wood.

Sporidia ·0005 long by ·0003.

1057. H. DECIDUUM, *B. & Br.* Pulvinatum, pruinosum vel scabrum, facile deciduum, peritheciis immersis; ostiolis abditis vel tantum prominulis (no. 172).

On leaves of some Palm. Central province, Dec. 1868.

1058. H. LYCOGALOIDES, *B. & Br.* Subglobosum, luteum, e mycelio contextu lutescente oriundum; peritheciis nigris, ostiolis prominulis, carne alba; sporidiis ellipticis verruculosis (no. 1090).

On bark. Central province, Dec. 1868.

About $\frac{1}{3}$ inch across.

Resembling on a small scale *H. compunctum*; mycelium like that of *Geaster mirabilis.*

1059. H. CERAMICHROUM, *B. & Br.* Globosum, superficiale, facile caducum, coccineum, carne pallida subconcolori, ostiolis punctiformibus (no. 1092).

On twigs of some climbing monocotyledon. Central province, Dec. 1868.

Oscillating between *Hypoxylon* and *Hypocrea.* Unfortunately there is no perfect fruit; about $\frac{1}{4}$ inch across.

1060. H. SUBGILVUM, *B. & Br.* Effusum, tenue, rubiginoso-pulveraceum, peritheciis subprominulis, ostiolo perforato minuto (no. 1087).

On bark; at first forming a very thin stratum, which easily cracks and peels off, at length becoming thicker, but is never distinctly pulvinate. Sporidia ·0004–·0005 long, ·0002–·00025 wide.

Resembling *H. corrugatum*, but never corrugated.

1061. H. MARGINATUM, *Schwein.* (Nos. 294, 296 in part, 297, 1082.)

On dead wood. Central province.

The sporidia in different specimens vary from ·0002 to ·0004, perhaps according to the nature of the matrix. No. 297 has pycnidia with spores ·00025 long.

1062. H. DISTILLATUM, *B. & Br.* Extus pulverulentum coffeicolor, basi dilatatum, peritheciis prominulis, dein papillosum, apice planum, ostiolo depresso, intus nigrum (no. 295).

On dead wood.

Somewhat resembling *H. fuscum*, but more nearly related to the last.

1063. H. RUBRICOSUM, *Mont. Syll.* p. 212. (No. 260.)

On dead wood.

Conidiiferous flocci flexuous, branched; conidia irregular, subelliptic, ·0002–·0303 long.

1064. H. CHRYSOCONIUM, *B. & Br.* Effusum, e mycelio albo, pulvere aurantiaco insperso, oriundum; peritheciis hemisphæricis, demum emergentibus, ostiolo prominulo (no. 1080).

On dead wood. Central province, Dec. 1868.

Forming little detached patches which are white below, partially covered with orange-coloured dust, which also at first clothes the perithecia; asci linear; sporidia ·00035 by ·0002.

1065. H. QUISQUILIARUM, *Mont. Ann. Sc. Nat.* 1855, iii. p. 117. Peritheciis late ovatis, ostiolo papillæformi, furfure luteo vestitis; ascis linearibus amplis; sporidiis cymbiformibus acutiusculis (nos. 239 *a*, 1072).

On twigs, bark, and dead wood. Peradeniya, Dec. 1868.

Sporidia ·0012 by ·0005, binucleate.

1066. H. CHALYBEUM, *B. & Br.* Peritheciis hic illic congestis, primum opacis, demum nitidissimis, globosis annulatim depressis; ostiolo papillæformi (no. 216).

On wood. Central province, up to 7000 feet.

Sporidia ·0003–·0005 long by ·0002.

Sometimes collected in groups of three or four, sometimes forming a continuous crust.

1067. H. NIPHIDIUM, *B. & Br.* Peritheciis prominulis in pulvinulos parvos aggregatis pulvere niveo conspersis; sporidiis cymbiformibus hyalinis 3-septatis (no. 1089).

On bark.

Sporidia ·001 long by ·0003.

A pretty little species.

1068. H. ANTHOCHROUM, *B. & Br.* Pulvinatum effusumque, pulverulentum, basi plerumque dilatatum, atropurpureum; contextu nigro; peritheciis prominulis; ostiolo papillæformi (nos. 160, 269).

On dead wood. Nov. 1867.

Sporidia ·0004 long.

1069. H. PERFORATUM, *Schwein.* (*sub* Sphæria) *Syn. Car.* 45. (No. 1084.)

On dead wood. Central province, Dec. 1868.

1070. H. VIVIDUM, *B. & Br.* Pulvinatum, extus aurantiaco-ferrugineum, pulverulentum, intus nigrum; peritheciis oblongis; ostiolis abditis (no. 1086).

On dead wood.

Often confluent and very irregular; sometimes spreading for several inches; perithecia occasionally slightly prominent; sporidia ·0007 by ·00035.

No. 153 is a conidiiferous state of some uncertain allied species with erect fasciculate threads slightly branched, their tips bearing broadly elliptic conidia ·0002 long. No. 165 is a similar production with erect simple threads, or with a short lateral process; conidia elliptic, ·00025 long.

1071. H. OODES, *B. & Br.* Late effusum, coffeæcolor; peritheciis parce confluentibus globosis opacis; ostiolo papillæformi, annulo parvo impresso circumdato; ascis linearibus: sporidiis breviter subcymbiformibus binucleatis (no. 1085).

On dead wood. Central province, Dec. 1868.

Sporidia ·0005 by ·00025.

1072. H. HYPOMILTUM, *Mont. Syll.* p. 214. (Nos. 1088, 1091.)

On dead twigs. Central province, Dec. 1868.

Sporidia ·00035–·0004 by ·0002.

No. 1088 is a little more dilated at the base, but has the same peculiar cinnabar-coloured stroma.

1073. H. TRUGODES, *B. & Br.* Effusum, pulvere vinoso hic illic transversim deficiente ornatum; peritheciis oblongis brevibus, sursum papillatis, hic illic undatis; sporidiis cymbiformibus (no. 269 in part).

On dead wood, over which it spreads.

It has at first the appearance of a *Reticularia*, from the pulverulent coating being here and there deficient, the surface shining on the uncovered spaces; sporidia ·0003 long.

1074. H. RUBIGINOSUM, *Fr.* (No. 570.)
On dead wood. Damboul, March 1868.

1075. H. UMBRINELLUM, *B. & Br.* Late effusum; peritheciis minutis ovatis metulæformibusque umbrinellis materie furfuracea vestitis; ascis linearibus; sporidiis subellipticis uniseptatis, demum echinulatis (no. 1111).
On dead wood with *Byssisedæ*. Central province, Dec. 1868.
Margin of the stroma often barren, as in *H. rubiginosum*; sporidia ·0005 by ·00025.

1076. H. DISCOLOR, *B. & Br.* Pulvinato-effusum, albo-vestitum; peritheciis materie citrina vel candida colligatis; ascis linearibus; sporidiis late ellipticis utrinque apiculatis (nos. 310, 347).
On sticks. Central province.
Sporidia ·00035 by ·00025.

1077. H. MURCIDUM, *B. & Br.* Late effusum; peritheciis oblongis in strato fusco pulverulento insidentibus; ostiolo papillæformi (no. 1083).
On dead wood. Central province.

ASTROCYSTIS, *B. & Br.*

Perithecia globosa, papillata, sigillatim e volva stellata erumpentia.

1078. ASTROCYSTIS MIRABILIS, *B. & Br.* (No. 785.)
On dead Bamboo stems. Peradeniya, Nov. 1868.
Densely crowded; volva bursting through the cuticle with about five stellate laciniæ; perithecia solitary, or very rarely by confluence two in each volva, opaque, with a distinct papillæform ostiolum; asci linear flexuous; sporidia uniseriate, brown, subcymbiform, ·0005 long.

1079. DIATRYPE RUSSODES, *B. & Br.* Gregaria, pustulata; peritheciis ellipticis collo brevi cylindrico, ostiolo obtuso; sporidiis octonis allantoideis (no. 303).
On bark.
Sporidia ·00035–·0004 long.

Allied to *D. Duriæi*, with which it agrees in having eight sausage-shaped sporidia in each ascus; but the ostiola are different.

1080. D. CHLOROSARCA, *B. & Br.* Parva, pustulata orbicularis, intus viridis, supra plana rugosa; ostiolis abditis (no. 1068).

Much smaller than any state of *D. flavo-virens*; and the ostiola

are in general quite concealed; asci clavate; sporidia ·0003–·00035, much the same as in the species just mentioned.

1081. D. PITHODES, *B. & Br.* Latissima, stromate tenui nigro; superficie picea nitente; peritheciis oblongis; ostiolis papillæformibus; sporidiis magnis cymbiformibus apiculatis (no. 168).

On dead wood. Ceylon, 1867.

Quite different from the numerous allied species; surface rough with the ostiola. *Sphæria clypeus*, Schwein., is the nearest; but that has minute elliptic sporidia; in this they are ·001–·001 long by ·0005.

1082. D. THELOIDES, *B. & Br.* Pustulata; ostiolis lævibus in disco parvo erumpente collectis; sporidiis allantoideis (no. 543).

On twigs. Central province, Feb. 1868.

Pustules closely adnate with the cuticle, which is blackened, sometimes merely lifting it up; sporidia ·0003 long.

1083. D. IRPEX, *B. & Br.* Late effusa; peritheciis magnis globosis ore longo flexuoso præditis; sporidiis fusiformibus magnis 5–6-septatis; conidiis minimis allantoideis aliisque ellipticis apicalibus (no. 251).

On wood.

Sporidia hyaline at either end, ·002–·003 long.

A magnificent species, spreading for several inches.

1084. D. GRISEO-TECTA, *B. & Br.* Peritheciis globosis immersis nigris, ostiolo papillæformi, e bysso griseo emergentibus (no. 1077).

On dead wood. Peradeniya, Jan. 1869.

Sporidia scarcely mature, about ·001 long.

At first sight looking as if it ought to be associated with Byssisedæ.

1085. D. GYROSA, *Schw.* (Nos. 290, 638.)—Sphæria gyrosa *auct.*

On sticks &c.

Sporidia uniseptate, oblong, rather pointed at one end; in no. 290, ·0005 long; in no. 683, ·0003–·0004 by ·00015–·0002.

1086. SPHÆRIA (BYSSISEDÆ) IMITATRIX, *B. & Br.* Late effusa, e strato nigro oriunda; peritheciis minutis collapsis asperulis; sporidiis uniseptatis (no. 1076).

Central province, Dec. 1868.

Sporidia oblong, subcymbiform, ·0006 long.

1087. S. (BYSSISEDÆ) BIHYALINA, *B. & Br.* Effusa, nigerrima; peritheciis globosis collapsis minutissime granulatis e mycelio byssoideo oriundis; sporidiis cymbiformibus triseptatis utrinque hyalinis (no. 560).

On dead wood. Central province, July 1868.

Sporidia ·0012–·0025 long. The threads of the mycelium bear uniseptate, very obtuse, shortly oblong conidia ·0005 long.

Very near *Sphæria Pezizula*, B. & Rav., which has similarly septate but shorter hyaline sporidia.

1088. S. (BYSSISEDÆ) BUNODES, *B. & Br.* Peritheciis magnis globosis verrucosis e strato strigoso oriundis; sporidiis maximis fusiformibus, apicibus elongatis acutissimis, multinucleatis (no. 169).

On dead wood. Peradeniya, Nov. 1867.

Mycelium consisting of fasciculated dark threads, hyaline above, branched and articulated; conidia in moniliform rows ·00015–·0002 long; perithecia nearly a line in diameter; asci with the same cap to the second membrane that occurs in many species of *Cordiceps*.

1089. S. (BYSSISEDÆ) EMERGENS, *B. & Br.* Peritheciis sero e mycelio velutino emergentibus; ostiolo prominulo; ascis clavatis; sporidiis maximis fusiformibus (no. 298).

On sticks.

Sporidia with a very thick outer coat ·0025 long; inner membrane capped as in the last; paraphyses slender.

1090. S. (BYSSISEDÆ) BOTHRINA, *B. & Br.* Peritheciis in foveolis mycelii sitis; sporidiis fusiformibus acutissimis (no. 299).

Resembling somewhat as to the form of the sporidia *S. Desmazierii*, but very distinct; sporidia ·0018 long.

1091. S. (BYSSISEDÆ) NIGRITA, *B. & Br.* Mycelio ancanthimorpho; peritheciis minute hispidulis; ascis linearibus; sporidiis ellipticis submetulæformibus uniseptatis utrinque hyalinis (no. 596).

On dead wood. Habgalla, Dec. 1867.

The mycelium resembles that of *S. acanthostroma*, Mont.; but the sporidia are much larger, besides having the tips hyaline; sporidia ·0005 long.

1092. S. (BYSSISEDÆ) HYSTRICULA, *B. & Br.* Peritheciis e strato hispido oriundis rugosiusculis, cito collapsis, setis rigidis ornatis; ostiolo minuto; ascis farctis; sporidiis oblongo-ellipticis (nos. 1074, 171 in part).

On bark.

Sporidia ·0004 by ·00015, 2–3-nucleate; asci ·003 long, clavate.

Allied to *S. tristis*, differing clearly in the rigid lancet-shaped hairs and stuffed asci.

1093. S. (BYSSISEDÆ) ACANTHOSTROMA, *Mont. Ann. Sc. Nat.* 1855, iii. p. 126. (No. 1029).

On dead wood.

Sporidia binucleate, ·0002–·00025 long.

1094. S. (BYSSISEDÆ) TETRADENIÆ, *B. & Br.* Mycelio repente e fibris tenellis septatis; peritheciis globosis subliberis; ascis ovatis brevibus; sporidiis oblongo-ellipticis.

On *Tetradenia.*

Sporidia ·0016 long.

1095. S. (BYSSISEDÆ) REGULINA, *B. & Br.* Peritheciis minutissimis ovatis obtusis e mycelio tenui oriundis; ascis clavatis; sporidiis biseriatis oblongis curvatis tenuibus (no. 1075).

Peradeniya, Dec. 1868.

Perithecia invisible to the naked eye; asci ·003 long; sporidia ·0008 by ·0002.

1096. S. (BYSSISEDÆ) RHODOSTICTA, *B. & Br.* Late effusa; peritheciis subglobosis verruculosis umbrinis lateritio-punctatis; ostiolo depresso rubro; sporidiis uniseptatis ellipticis 2–4-nucleatis (no. 1108).

On decayed wood. Peradeniya, Dec. 1868.

Certainly allied to *S. rhodomphala*, B.; but the sporidia, ·001 by ·0003, are much less elongated, in that species ·0009 long.

1097. S. (BYSSISEDÆ) AQUILA, *F.* (No. 219 in part.)

On dead wood.

1098. S. (VILLOSÆ) HEMIPSILA, *B. & Br.* Sparsa; peritheciis minutis subglobosis dealbatis sursum nudis, basi filis rigidis munitis; sporidiis curvis flexuosis triseptatis (no. 1078).

Peradeniya, Jan. 1869.

Sporidia biseriate, ·002 long, triseptate.

1099. S. (VILLOSÆ) CHLORONEMA, *B. & Br.* Peritheciis globosis breviter albo-tomentosis, ostiolo nigro, intus materie viridi repletis (no. 1109).

On fragments of wood. Peradeniya, Jan. 1869.

The sporidia are unfortunately in too young a state to ascertain their form; but the species is very distinct.

1100. S. (VILLOSÆ) TEPHROCOMA, *B. & Br.* Peritheciis setis sparsis rigidis vestitis; ascis clavatis; sporidiis fusiformibus triseptatis; conidiis conformibus uniseptatis (no. 147).

On palm leaves.

Sporidia ·0011 long; spores from pycnidia ·0004; helminthosporoid conidia ·003.

1101. S. (VILLOSÆ) CIRRHOSTOMA, *B. & Br.* Peritheciis subglobosis nigro-villosis disco gilvo; ostiolo depresso punctiformi; ascis cla-

vatis; sporidiis fusiformibus, endochromate 2–4-partito (nos. 171, 1073).

On dead wood. Peradeniya, Dec. 1868.

Sporidia ·0015 by ·0003.

In no. 171 some of the hairs are lancet-shaped. From κιρρὸς, tawny.

In the same group are specimens externally just the same, but with very small hyaline strongly curved sporidia. Apparently another form of fructification in the same species.

1102. S. (VILLOSÆ) XANTHOTRICHA, *B. & Br.* Peritheciis aggregatis flavo-lanatis; ostiolo punctiformi nigro; sporidiis subcymbiformibus 4–5-septatis (no. 1110).

On the cuticle of some monocotyledon. Central province, Dec. 1868.

Sporidia ·00065 long.

1103. S. (VILLOSÆ) ACANTHIGERA, *B. & Br.* Peritheciis ovatis, sub lente pallide fuscis spinis brevibus latis concoloribus vestitis; sporidiis linearibus curvis (no. 576).

On dung. Habgalla, Dec. 1867.

The spines of this species are extremely curious, broad at the base, resembling in miniature those of a rose. The sporidia, when mature, are probably like those of *S. hirsuta*; but in the specimens before us they are clearly young.

1104. S. (DENUDATÆ) CATERVARIA, *B. & Br.* Disseminata; peritheciis globosis opacis ostiolo minuto; ascis linearibus; sporidiis fuscis ellipticis (no. 170).

On dead wood. Central province.

With *Sph. Janus.* About the size of *S. spermoidea*; sporidia ·0015 long.

1105. S. (DENUDATÆ) JANUS, *B. & Br.* Gregaria, opaca, furfuracea, quandoque conglomerata; ostiolo papillæformi elongatoque; sporidiis oblongis curvis (no. 170 in part).

On dead wood. Central province.

Sporidia ·002, like those of *S. Bombarda.*

1106. S. (DENUDATÆ) RHYPARA, *B. & Br.* Peritheciis globosis coffeicoloribus sordidis, ostiolo minuto; ascis linearibus; sporidiis ellipticis utrinque attenuatis (no. 555).

On dead wood.

Sporidia ·0009–·001 by ·0004–·0005.

1107. S. (PERTUSÆ) VESUVIUS, *B. & Br.* Sparsa; peritheciis magnis, e basi truncata conicis, ostiolo acuto; sporidiis fusiformibus fuscis biconicis, medio contractis, utrinque uniseptatis (no. 212).

On decayed wood. Nov. 1867.
Perithecia ¾ line across and as much high ; sporidia ·0018 by ·0005.

1108. S. (PERTUSÆ) AGNOCYSTIS, *B. & Br.* Innata, conica, coffeicolor, lævissima; ostiolo papillæformi; sporidiis biconicis utrinque hyalinis (no. 649).

On dead wood. South of the island, July 1868.

1109. S. (MACROSTOMÆ) PACHYTHELE, *B. & Br.* Sparsa; peritheciis magnis subglobosis; ostiolo magno, transversim rimoso, margine quandoque papillato; sporidiis biconicis, medio contractis, utrinque hyalinis, biseriatis (no. 577).

On dead wood. Dolosbagey, 3000 ft., May 1868.
Sporidia ·0006 by ·0001–·00015.

1110. S. (CÆSPITOSÆ) PLICATULA, *B. & Br.* Fasciculato-congesta; peritheciis atris collapsis minute granulatis plicato-rugosis; sporidiis doliiformibus utrinque leviter attenuatis, nucleo magno (nos. 39, 1069).

On bark. Central province, Dec. 1868.
Asci clavate; sporidia biseriate, ·0006–·0008 long by ·0004–·0005.

Very near *Sphæria Pezizula*, B. & Rav., which has shorter hyaline sporidia.

1111. S. (CÆSPITOSÆ) LIGNYODES, *B. & Br.* Effusa, congesta; peritheciis clavatis e collabendo cupulæformibus, opacis, subtiliter tomentosis; ascis clavatis; sporidiis oblongis uniseptatis (no. 288).

On decorticated wood.
Sporidia oblong, slightly curved, uniseptate, ·001 long; possibly, in a more advanced stage, triseptate, as the endochrome is divided into four portions.

1112. S. (OBVALLATÆ) PENES, *B. & Br.* Cortici immersa; ostiolis minimis congestis, tandem emergentibus; ascis clavatis; sporidiis minimis allantoideis (no. 304).

On bark, which seems at first merely sprinkled with black specks.

1113. S. (OBTURATÆ) MEGALOSPORA, *Mont. Ann. Sc. Nat.* 1850. xiv. p. 324. (No. 302.)

On twigs, bursting through the cuticle and at length falling out.
Sporidia uniseriate, brown, very obtuse, equal or larger above, uniseptate, ·002 long.

1114. S. (OBTURATÆ) CHIONANTHI, *B. & Br.* Peritheciis minutis epidermide hyalina tectis; sporidiis uniseptatis; spermatiis aculearibus (no. 518).

On *Chionanthus zeylanica*. Damboul, March 1868.

Forming little yellow patches consisting partly of the minute perithecia, partly of the larger bodies containing the spermatia; sporidia ·0008 by ·0003; spermatia ·0005–·0008 long.

1115. S. (Confluentes) Eterio, *B. & Br.* Peritheciis in glebulam umbrinellam conglomeratis, ostiolis punctiformibus prominulis; sporidiis late ellipticis (no. 559).

Habgalla, Feb. 1868.

Sporidia ·0045 by ·0025.

1116. S. (Confluentes) hypoleuca, *B. & Br.* Peritheciis globoso-depressis confluentibus in mycelio arcte adnato parco innatis (no. 545).

On bark. Habgalla, Feb. 1868.

Sporidia varying from ·0003–·00034, or ·0002–·00025 by ·00012.

1117. S. (Confluentes) epixantha, *B. & Br.* Mycelio sulfureo; peritheciis confluentibus depressis materie nigra alligatis; ostiolo candido medio stictico (no. 1081).

On rotten logs. Central province, Dec. 1868.

1118. S. (Confluentes) albo-fulta, *B. & Br.* Mycelio orbiculari candido; peritheciis latis depressis confluentibus; ostiolo papillæformi nitido.

Central province, Dec. 1868.

This and the last have much the appearance of Lichens; the perithecia vary immensely in size.

1119. S. (Foliicolæ) Cleidionii, *B. & Br.* Peritheciis gregariis immersis minutis e macula fusca oriundis; ascis clavatis; sporidiis oblongis uniseptatis (no. 414).

On leaves of *Cleidionium javanicum.*

Slightly raising the cuticle; sporidia ·0006 long.

1120. S. (Foliicolæ) Pandanicola, *B. & Br.* Peritheciis superficialibus brunneis hemisphæricis, basi mycelio parco cinctis, in plagas parvas collectis; ascis linearibus; sporidiis ellipticis nigris (no. 431).

On leaves of *Pandanus odoratissimus.*

Sporidia ·0005 long.

1121. S. (Depazea) nesodes, *B. & Br.* Peritheciis minutissimis, in maculas pallidas congestis, fuscis; sporidiis fusiformibus curvulis triseptatis (no. 484).

On leaves of *Hydrocotyle asiatica.* Peradeniya, Jan. 1868.

Sporidia ·0005 long.

Depazea Hydrocotyles, Rab. is very different.

1122. S. (Depazea) oxalidis, *Kirsch.* (No. 486.)

On *Oxalis corniculata.* Peradeniya, Jan. 1868.

Perithecia with a few branched threads at the base; asci broader at the base, ·0015 long by ·0004; sporidia oblong ·0004–·0005 long, with from one to three nuclei.

1123. S. (Depazea) perusta, *B. & Br.* Orbicularis, limitata, fusca, centro pallida; sporidiis ellipticis (no. 496).

On leaves of *Dioscorea tomentosa,* July 1868.

Asci ·003 long; sporidia ·0005 long, but scarcely mature.

1124. S. (Depazea) Rottleræ, *B. & Br.* Epiphylla, e macula umbrina pallida oriunda, orbicularis, nivea, limitata; peritheciis atris (no. 1228).

On leaves of *Rottlera quadricocca,* Roxb. Peradeniya, July 1871.

1125. Melanospora chrysomalla, *B. & Br.* Peritheciis globosis, dense flavo-villosis; ostiolo cylindrico brunneo; ascis linearibus; sporidiis oblongis diploseptatis (no. 1071).

Apparently on some Palm. Peradeniya, Nov. 1868.

Sporidia ·0005 long, triseptate, with one or two oblique divisions.

Forming little patches which at first resemble a *Trichia**.

1126. Rhytisma maculosum, *B. & Br.* Orbiculare, tenue, margine tenui celluloso; cellulis minutis numerosis granulæformibus; ascis vibus late obovatis; sporidiis oblongis obtusissimis, centro contractis, uniseptatis (nos. 426, 497).

On leaves of *Sterculia alata,* Roxb. Peradeniya, Nov. 1867. On *Causjera Rheedii,* Gmel., July 1868.

Margin composed of radiating elongated cells; sporidia ·001 long.

1127. R. filicinum, *B. & Br.* Maculis suborbicularibus tenuibus, cellulis elongatis flexuosis tenuibus; ascis clavatis; sporidiis oblongis angustis uniseptatis (no. 453).

On fronds of *Alsophila gigantea.* Galagama, central province, May 1856.

Sporidia ·0005 long.

Coming near to *Lembosia,* Lév.

1128. R. Pongamiæ, *B. & Br.* Irregulare, in macula lutea insi-

---

* Trypethelium crocosarca, *B. & Br.* Croceum pulvinatum, contextu concolori; peritheciis nigris, ostiolis immersis; sporidiis fusiformibus multiseptatis (no. 131).

On wood. Nov. 1867.

Forming little pulvinate masses $\frac{1}{2}$–$\frac{3}{4}$ line wide, saffron-yellow, dotted where the ostiola open; substance of the same colour; sporidia ·0015 long by ·0005, with twelve or more septa; paraphyses linear.

dens; cellulis prominulis late conicis; ascis clavatis; sporidiis ellipticis endochromate utrinque contracto (no. 492).

On leaves of *Pongamia glabra*. March 1868.

1129. R. Pterygotæ, *B. & Br.* Orbiculare, tenue, cellulis irregularibus quandoque circinatum; ascis late ellipticis; sporidiis oblongis uniseptatis extus gelatinosis; spermatiis oblongis minimis.

On leaves of *Pterygota alata*. Peradeniya, April 1866.

1130. R. placenta, *B. & Br.* Parvum, orbiculare, cuticula demum marginem versus rupta; ascis brevibus; sporidiis oblongis obtusissimis uniseptatis medio constrictis (nos. 409, 420).

On leaves of *Symplocos spicata*. Peradeniya, Nov. Dec. 1867. On *Pavetta indica*, β. Peradeniya, Dec. 1867.

It is possible that these may be two distinct species. In no. 409 sporidia ·0012 long, in no. 420 ·0006 long.

1131. R. spurcarium, *B. & Br.* Maculis tenuibus orbicularibus, hic illic rimulis granulisve marginalibus apertis; ascis brevibus; sporidiis obtusis medio contractis uniseptatis (no. 422).

On leaves of *Artocarpus integrifolia*. Peradeniya, Dec. 1867.

Sporidia ·001 long.

1132. R. constellatum, *B. & Br.* Maculis orbiculatis, granulis marginalibus circinantibus circumdatis; ascis clavatis; sporidiis elongatis asperulis uniseptatis.

On the same leaves with the last.

Sporidia ·0006–·0009 long.

1133. Lembosia tenella, *Lév. Ann. Sc. Nat.* 1845, iii. p. 58.

On leaves of *Eugenia*. Found also in Taiti.

1134. Pemphidium dilatatum, *B. & Br.* Peritheciis depressis, basi dilatatis, opacis; ascis clavatis; sporidiis breviter subcymbiformibus (no. 293).

On the petioles apparently of some Palm.

Sporidia ·0008 long by ·0006.

1135. Piptostoma spilotum, *B. & Br.* Minutum, planum, cito circumscissum; ascis lanceolatis; sporidiis oblongis curvulis (no. 348).

Sporidia ·0025 long.

1136. Micropeltis asterophora, *B. & Br.* Mycelio repente, conidiis tetraplois echinulatis consperso; peritheciis depressis minimis (no. 427).

On the upperside of leaves of *Panicum*, forming little byssoid spots on which are situated the minute perithecia. Peradeniya, Nov. 1867.

The conidia are very like the spores of *Sporidesmium tessarthrum*, B. & C.

1137. M. GOMPHISPORA, *B. & Br.* Minutissima, hemisphærica, margine vix applanato; sporidiis biseriatis cuneiformibus; endochromate utrinque contracto (no. 411).

On leaves of *Pavetta indica.* Peradeniya, Nov. 1867.

Extremely minute; sporidia obtuse at either end, separated into two portions by a hyaline line, ·0003–·0006 long; perithecia minutely granulated, ·001 in diameter, or less.

1138. M. APPLANATA, *Mont. Cub.* p. 325.

On leaves of *Agyneia multilocularis.* Peradeniya, Nov. 1867.

Sporidia fusiform, multiseptate, ·0002 long; in *M. marginata* ·0003 long.

1139. M. GRANULATA, *B. & Br.* Minuta, granulata; ascis linearibus; sporidiis lævibus late ellipticis (no. 526).

On leaves of *Cæsalpinia sepiaria.* Mátalé, March 1868.

Rather spread out at the base, coarsely granulated, growing on the green parts of half-dead leaves; sporidia ·0005 by ·0003.

1140. ASTERINA PELLICULOSA, *B. Bot. Ant. Voy. Crypt.* p. 147 (nos. 421, 490, 498).

On leaves of *Pavetta indica, Jasminum Sambac, Acrotrema,* and *Rottbœllia nigricans.* On *Mallea Rothii,* Feb. 1868.

Asci obovate; sporidia elliptic, ·0008.

1141. A. MICROPELTIS, *B. & Br.* Peritheciis punctiformibus solitariis, mycelio brevi ramoso cinctis (no. 446).

On leaves of *Jambosa hemisphærica.*

1142. A. NUBECULA, *B. & Br.* Peritheciis minimis depressis marginatis, in macula nebulosa sitis, fissurâ tripartita ruptis; ascis brevibus clavatis; sporidiis fusiformibus uniseptatis.

On leaves of *Antidesma.*

Sporidia ·0005 long.

There is also a species on *Rottlera tinctoria* with depressed perithecia situated on snow-white spots, but unfortunately without fruit.

1143. A. PLEUROSTYLIÆ, *B. & Br.* Peritheciis in maculis suborbicularibus membranaceis nigris sitis; sporidiis doliiformibus 4-septatis, articulis constrictis (no. 470).

Peradeniya, Dec. 1867.

Threads of the mycelium short, coarse, septate, more than usually compact; sporidia ·0022 long, ·001 wide.

1144. HYSTERIUM MACULARE, *Fr.* (No. 434.)

On leaves of *Symplocos.* Nuwara Eliya.

1145. H. FOURCROYÆ, *B. & Br.* Lirellis brevibus depressis rufis fissura angusta; sporidiis fusiformibus multinucleatis (nos. 361, 507 in part).

On leaves of *Fourcroya.*

Irregularly scattered, giving the leaves a dingy appearance; sporidia ·0003 long.

The same thing occurs on palm-leaves, with the sporidia ·004 long.

1146. H. ATRAMENTARIUM, *B. & Br.* Minutum, ellipticum, e crusta nigra oriundum; sporidiis clavatis trinucleatis (no. 300).

On wood.

Lirellæ scarcely visible to the naked eye; asci short, linear; sporidia hyaline ·0003.

1147. H. DRYNARIÆ, *B. & Br.* Lirellis immersis flexuosis, labiis candidis; sporidiis triseptatis ellipticis, apicibus acutiusculis; conidiis minimis (no. 611).

On fronds of *Drynaria quercifolia.* Tropical forests, July 1868.

Very lichenoid in appearance, covering the whole of the underside of the frond. Accompanied by multitudes of pallid minute perithecia filled with oblong spores ·0002 long.

1148. ANGELINA LEPRIEURII, *Mont. Syll.* p. 188. (Nos. 6, 362, 1066.)

On wood &c. Central province &c., Dec. 1868.

No. 1066 is on a confluent *Sphæria.* Sporidia ·0012–·0015 long by ·0005. Varying in the degree in which it is transversely striate, and in the size of the sporidia.

1149. GLONIUM ORBICULARE, *B. & Br.* Lirellis circinantibus in maculam orbicularem congestis; sporidiis oblongis quadriseptatis (no. 671).

On Bamboo.

Nearly ¼ inch across; lirellæ circinating round a central naked black spot, superficial, easily chipping off; sporidia ·0005 long, but scarcely mature.

1150. AILOGRAPHUM INTRICATUM, *B. & Br.* Lirellis intricatis reticulatis, in maculis orbicularibus serius confluentibus dispositis (no. 1226).

On leaves of *Pandanus.*

1151. DOTHIDEA ORBIS, *B.* Parva, orbicularis; sporidiis oblongis angustis uniseptatis.

On leaves of *Litsæa.*

Sporidia ·0006 long.

1152. D. DEMERSA, *Cd. Ic.* iv. 41. (Nos. 520, 464.)

On living leaves of *Ixora parvifolia, Croton Thwaitesianum,* Müll. Nalaude, March 1868.

Asci linear; sporidia elliptic, acute at either extremity, ·0004 long.

No. 464, on *Ixora parviflora*, Peradeniya, Jan. 1868, differs in the shortly fusiform granulated sporidia ·0005–·0006 long.

1153. D. RHYTISMOIDES, *Cd. Ic.* iv. 42. (Nos. 520, 423 in part.)
On leaves of *Hugonia mystax*. Damboul, March 1868.

1154. D. MICROCENTA, *B. & Br.* Stromate irregulari, medio elevato, toto punctato; ascis clavatis; sporidiis biseriatis, late ellipticis suborbicularibus (no. 423 in part).
On leaves apparently of *Artocarpus*.

With the last; but the surface is finely punctate, and the sporidia are much rounder.

1155. D. EXSCULPTA, *B. Hook. Kew Journ.* 1854, p. 232. (No. 593.)
On leaves of *Aporosa Lindleyana*. Rambukan, April 1868.

1156. D. REPENS, *B. in Hook. Journ.* 1854, p. 231.
On leaves of *Ficus religiosa*. Sept. 10, 1850.

1157. D. ASPIDEA, *B. & Br.* Elevata, nitida, late conica, apice plerumque plana, basi margine fusco luteo cincta; sporidiis ellipticis; spermogoniis acicularibus (nos. 423 in part, 499).
On *Ficus repens* &c. Peradeniya, Dec. 1867.
Sporidia ·0008 long, spermogonia ·0005 long.

No. 499, on *Urostigma tomentosum*, is either a variety or very closely allied species; the centre of the pustules is often barren, and the cells collected round the vacant space; the sporidia are the same, but the asci stouter and more clavate.

1158. D. GRAMINIS, *Fr.* (Nos. 468, 489, 733, 734 in part.)
On *Spodiopogon*. Peradeniya, Jan. 1868. *Ichnanthes pallens*, Munro: central province. *Panicum fluitans*: Kornegalle, Aug. 1868.
Sporidia nearly globose.

1159. D. STENOSPORA, *B. & Br.* Sporidiis angustis utrinque acuminatis; cætera *D. Graminis*.
On *Panicum trigonum*. Peradeniya, Jan. 1868.
Sporidia very narrow, subfusiform, acute, ·0006 long.

There is no external difference.

1160. D. OSBECKIÆ, *B. & Br.* Pseudo-peritheciis hemisphærico-conicis congestis nitidis; ascis brevibus; sporidiis oblongis uniseptatis (no. 734).
On *Osbeckia virgata*. Kornegalle, Aug. 1868.
Sporidia ·0007–·0008 long.

1161. D. ELETTARIÆ, *B. & Br.* Pseudoperitheciis nitidis, in acervulos congestis, hemisphærico-subconicis; ascis clavatis; sporidiis uniseptatis oblongis (no. 433).

On leaves of *Elettaria floribunda*. Thw. Habgalla, Dec. 1867.
Sporidia ·0009 long.

1162. D. Tetrantheræ, *B. & Br.* Stromatibus minutis, in maculis orbicularibus dispositis; ascis linearibus clavatisque; sporidiis ellipticis (no. 442).

On *Tetranthera Roxburghii* and *T. tomentosa.*
Sporidia ·0005 long.

No. 528 appears to be a variety seated on brown spots, Peradeniya, Feb. 1868. We have not seen any fruit.

1163. D. Thwaitesii, *B. Hook. Journ.* 1854, p. 233.
On leaves of *Ficus oppositifolia.* Oct. 12, 1850.

1164. D. perisporioides, *B. & C.* (Nos. 444, 456, 494.)
On leaves of *Desmodium triflorum*, Peradeniya, Dec. 1867.
Sporidia ·0012 long.

1165. D. dolichigena, *B. & Br.* Pseudoperitheciis confluentibus nitidis, quandoque dispersis; ascis clavatis; sporidiis globosis (no. 407).

On leaves of *Dolichos.* Peradeniya, Dec. 1867.
Sporidia ·0004 long.

1166. D. grammodes, *Kz.*
On leaves of *Crotalaria verrucosa.* Peradeniya. On *Indigofera flaccida*, Feb. 1868.
Sporidia ·0009 long.

1167. D. edax, *B. & Br.* Minuta, punctiformis, nitida, e macula lutea oriunda; ascis lanceolatis; sporidiis filiformibus curvulis multinucleatis (no. 502).

On leaves of *Tephrosia suberosa.*
Sporidia ·0002 long. On the same spots are minute bright scarlet tendrils consisting of extremely minute spores, which are probably a second form of fructification.

1168. D. phaselina, *Mont.* Linearis, parallela; pseudoperitheciis erumpentibus, cuticula marginatis; ascis brevibus clavatis; sporidiis curvatis (no. 214).

On Bamboo.
Sporidia ·00035.

1169. D. calamigena, *B. & Br.* Pseudoperitheciis seriatis in macula flava sitis nitidis; ascis clavatis; sporidiis obtusissimis oblongis, medio leviter constrictis (no, 443).

On *Calamus rudentum.*
Forming elongated lines, sometimes two rows in one stroma, often parallel, seated on yellow patches; sporidia ·0014 long.

1170. D. FILICINA, *Mont.*

On leaves of Ferns, 1851.

Asci short, obovate; sporidia obovate, uniseptate, ·0005 long.

1171. D. CALOPHYLLI, *B. & Br.* Hysteriiformis, emergens, ostiolis latitantibus; ascis clavatis; paraphysibus linearibus; sporidiis sigmoideis angustis uniseptatis (no. 590).

On leaves of *Calophyllum Walkeri.* Nuwara Eliya, 7000 feet, April 1868.

Asci ·0035 long by ·0005; sporidia ·0015–·002 long by ·00025.

1172. D. BARRINGTONIÆ, *B. & Br.* Cellulis radiantibus, in maculis latis orbicularibus dispositis, minutis, apice niveis.

On leaves of *Barringtonia speciosa.* Botanic Garden, Peradeniya, Oct. 1864.

Unfortunately there is no fruit; but the production is too remarkable to pass by altogether. It has at first sight the appearance of an *Asteroma.*

1173. D. TETRADENIÆ, *B.* Mycelio floccis reticulatis radiantibus; pseudoperitheciis hic illic sparsis; ascis ellipticis; sporidiis oblongis hyalinis.

On the underside of leaves of *Tetradenia.*

Forming little thin patches. Sporidia ·0015 long.

Var. *triseptata* (no. 1137), central province, Dec. 1868, seems to differ merely in having the sporidia 3-septate instead of 4-septate.

1174. MELIOLA AMPHITRICHA, *Fr.* (No. 529.)

On *Terminalia Belerica.* Peradeniya, Feb. 1868. On *Dysoxylon, Hippocratea indica.*

1175. M. MÆRENHOUTIANA. (No. 434.)

On leaves of *Symplocos.* Nuwara Eliya.

Sporidia oblong elliptic, 3-septate, ·0018 long.

1176. M. HYALOSPORA, *Lév. Ann. Sc. Nat.* 1846, v. p. 266.

On leaves of *Acrotrema.*

1177. M. ZIGZAG, *B. & C. Journ. Linn. Soc.* x. p. 392, (Nos. 424, 485.)

On leaves of *Cinnamomum zeylanicum.*

1178. M. MOLLIS, *B. & Br.* Filis mollibus rhachidoideis; ascis linearibus; sporidiis ellipticis uniseptatis (no. 516).

On leaves of *Syzygium Jambolana.* Damboul, March 1868.

Forming orbicular, soft, black patches bearing minute conidia ·00015

long, on the tips of the threads; sporidia ·0008 long, ·0004 wide, which in germination send out from one end a number of delicate threads.

1179. M. FURCATA, *Lév. Ann. Sc. Nat.* 1846, v. p. 260. (No. 419.)
On leaves of *Atalantia*. Peradeniya, Dec. 1867.
Sporidia ·0018 long.

1180. EUROTIUM DIPLOCYSTIS, *B. & Br.* Irregulare, subglobosum vel elongatum, flavum, demum aurantiacum; ascis globosis pedunculatis e floccis decumbentibus oriundis; sporidiis octonis ellipticis (no. 291).
The ascus itself is soon absorbed, as in the genus *Badhamia*; the peduncle is long and flexuous, several arising from decumbent branched threads.

This may possibly be a distinct genus; but we have scarcely sufficient materials to decide.

PHYSOMYCETES.

1181. PAUROCOTYLIS FULVA, *B & Br.* Depresso-subglobosa, extus lateritio-fulva, intus flava; sporis magnis obovatis (no. 963).
On the ground. Peradeniya, Jan. 1869.
About ½ an inch across, attached by a short, rooting, spongy mass; spores ·003 long.

1182. P. FRAGILIS, *B. & Br.* Pallide griseo-flava, fragilissima; sporis globosis (no. 964),
On the ground. Peradeniya.
About ¼ inch across; so fragile that it crumbles into atoms; spores ·002 in diameter.

SCLEROCYSTIS, *B. & Br.*

Capitulum globosum, tomentosum; stipes cylindricus; flocci compositi; cysti elliptici.

1183. SCLEROCYSTIS COREMIOIDES, *B. & Br.* (No. 155.)
Looking at first like a *Coremium*; head globose, hard, and compact; flocci rigid, compound; cysts elliptic, slightly rugose, sometimes giving out in every direction soft hairs.

A very singular plant, of which unfortunately the real nature of the fruit is not apparent.

1184. MUCOR ARTOCARPI, *B. & Br.* Fuscus, congestus, floccis inarticulatis versiculis globosis vel obovatis; sporis subellipticis (no. 234).
On fruit of *Artocarpus integrifolia*.

We do not find any columella.

1185. ACROSTALAGMUS FULVUS, *B. & Br.* Pulvinulis fulvis; sporangiis globosis; sporis breviter ellipticis vel subellipticis (no. 236).
On leaves of some Monocotyledon.
Spores ·0002 long.

1186. ANTENNARIA SCORIADEA, *B.* (No. 418.)
Nuwara Eliya, August.

1187. PISOMYXA AMOMI, *B. & Br.* Floccis curvis intricatis rugosis nigris; sporangiis globosis; sporis globosis hyalinis (no. 1134).
On leaves of some *Amomum.*
Forming little dark oblong patches; sporangia formed at the tips of the curved, rugose, intricate threads, at first opaque, about ·001 in diameter, then hyaline, the walls clearly cellular.

This belongs apparently to Corda's *Pisomyxa,* which is closely allied to *Antennaria.* Pycnidia with oblong uniseptate spores occur amongst the threads.

EXPLANATION OF THE PLATES.

PLATE II.

Fig. 1. Spores of *Agaricus goniosporus,* B. & Br. Magnified.
2. *Rhacophyllus lilacinus,* B. & Br. *a,* plant, natural size; *b,* vertical section; *c,* slightly magnified; *d,* gills, with processes more highly magnified; *e,* variety with cylindrical pileus.
3. Gills of *Panus coriaceus,* B. & Br. Magnified to show the processes.
4. Spores of *Hydnum Thwaitesii,* B. & Br. Magnified.
5. *Artocreas poroniæformis,* B. & Br. *a,* plant, natural size; *b,* section magnified; *c,* thread, with spores; *d,* spore and contents.
6. *Alwisia bombarda,* B. & Br. *a,* single peridium, magnified; *b,* thread; *c,* spores.

PLATE III.

7. *Sphæropsis anomala,* B. & Br. *a,* plant, slightly magnified; *b,* edge of spot; *c,* spores arising from the cellular base; *d,* spores, highly magnified.
8. *Septonema olivaceum,* B. & Br. *a,* flocci with young fructifying apex; *b,* spores and separate articulations.
9. *Chætopsis graminicola,* B. & Br. *a,* plant on grass-leaves; *b,* main thread; *c,* spores *in situ*; *d,* separate, more highly magnified.
10. *Hemileia vastatrix,* B. & Br. *a,* plant *in situ,* slightly magnified; *b,* a group of young threads; *c,* sorus, seen from above; *d,* threads with young spores; *e,* spores, magnified.

PLATE IV.

11. *Ravenelia indica,* B. *a,* pseudospores; *b,* glandular stipitate bodies.

Fig. 12. *Ravenelia sessilis*, B. Pseudospores, magnified.
13. *Ravenelia stictica*, B. & Br. Pseudospores, magnified.
14. *Ravenelia macrocystis*, B. & Br. Pseudospore, magnified.
15. *Isaria pulcherrima*, B. & Br. *a*, single plant, magnified; *b*, portion, more highly magnified; *c*, fructifying thread; *d*, the same when divested of its spores; *e*, spores.
16. *Stilbum rhytidosporum*, B. & Br. Single plant and separate spore.
17. *Periconia monilifera*, B. & Br. *a*, single plant, magnified; *b*, tip of the same, more highly magnified; *c*, portion of stem; *d*, component threads of head with fruit; *e*, necklace of spores; *f*, spores.
18. *Pithomyces flavus*, B. & Br. *a*, plant, natural size; *b*, the same, slightly magnified; *c*, thread; *d*, spores, more or less magnified.

Plate V.

19. *Penicillium incarnatum*, B. & Br. *a*, single young plant; *b*, spores.
20. *Rhinotrichum globiferum*, B. & Br. *a*, threads with spores; *b*, spore, more highly magnified.
21. *Peziza insititia*, B. & C. *a*, ascus; *b*, paraphysis; *c*, sporidia.
22. *Peziza læticolor*, B. & Br. *a*, ascus; *b*, sporidia.
23. *Peziza verruculosa*, B. & Br. *a*, ascus and paraphysis; *b*, sporidia.
24. *Ascobolus Thwaitesii*, B. & Br. *a*, asci, with single and double row of sporidia; *b*, sporidia.
25. *Platygrapha bivela*, B. & Br. *a*, ascus with paraphysis; *b*, sporidia.
26. *Platygrapha magnifica*, B. & Br. *a*, asci with paraphyses; *b*, sporidia, with separate joints at *c*.
27. *Hydnocystis Thwaitesii*, B. & Br. *a*, ascus with paraphyses; *b*, sporidia.
28. *Hypomyces chrysostoma*, B. & Br. *a*, perithecia, magnified; *b*, ascus; *c*, sporidia.

Plate VI.

29. *Hypomyces stilbiger*, B. & Br. *a*, perithecium with *Stilbum* attached and free; *b*, ascus with sporidia; *c*, sporidium more or less broken up.
30. *Nectria flavo-lanata*, B. & Br. *a*, perithecium; *b*, process from its walls; *c*, ascus; *d*. sporidia; *e*, two forms of conidia.
31. *Nectria trichospora*, B. & Br. *a*, perithecia, magnified; *b*, ascus; *c*, sporidium.
32. *Nectria aurantiicola*, B. & Br. *a*, barren plant; *b*, plant with perithecia; *c*, asci; *d*, sporidia; *e*, flocci with fusiform conidia; *f*, conidium.
33. *Hypoxylon lycogaloides*, B. & Br. *a*, ascus; *b*, sporidia.
34. *Hypoxylon niphidium*, B. & Br. *a*, perithecia *in situ*, magnified; *b*, ascus; *c*, sporidia.

Plate VII.

35. *Hypoxylon umbrinellum*, B. & Br. *a*, perithecium; *b*, ascus; *c*, sporidia, young and old.
36. *Astrocystis mirabilis*, B. & Br. *a*, plant, natural size; *b*, *c*, more or less

magnified; *d*, young asci; *e*, ascus; *f*, sporidia; *g*, ostiola in different states.

Fig. 37. *Diatrype irpex*, B. & Br. *a*, perithecia, magnified; *b*, ascus; *c*, sporidia; *d*, tip of ostiolum; *e* conidia.

Plate VIII.

38. *Sphæria bunodes*, B. & Br. *a*, ascus; *b*, tip of ascus; *c c*, sporidia.
39. Supposed conidioid of do.
40. *Sphæria nigrita*, B. & Br. *a*, ascus; *b*, sporidia; *c*, thread from subiculum.
41. *Sphæria emergens*, B. & Br. *a*, ascus and paraphysis; *b*, tip of ascus; *c*, sporidia.
42. *Sphæria hystricula*, B. & Br. *a*, portion of perithecium; *b*, ascus; *c*, sporidia.
43. *Sphæria acanthostroma*, Mont. *a*, perithecium, magnified; *b*, asci; *c*, sporidia; *d*, threads of subiculum.

Plate IX.

44 & 44*a*. *Sphæria cirrhostoma*, B. & Br. *a a*, portions of perithecia to show the different conditions of the hairs with which they are clothed; *b b*, asci; *c*, sporidia.

45, *Sphæria acanthigera*, B. & Br. *a*, portion of the wall of the perithecia; *b*, sporidia; *c*, portion of wall bearing conidiophora; *c*, conidia.

46. *Sphæria pachythele*, B. & Br. *a*, perithecium, magnified; *b*, ascus with paraphyses; *c*, sporidia.
47. *Melanospora chrysomalla*, B. & Br. *a*, ascus; *b*, sporidia.
48. *Micropeltis gomphispora*, B. & Br. *a*, ascus; *b*, sporidia.
49. *Asterina pelliculosa*, B. *a*, portion of perithecium with asci and thread; *b*, ascus; *c*, sporidium.
50. *Aylographum intricatum*, B. & Br. *a*, ascus *in situ* with paraphyses; *b*, sporidium.
51. *Dothidea stenospora*, B. & Br. *a*, ascus; *b*, sporidia.
52. *Dothidea Calophylli*, B. & Br. *a*, asci with paraphyses; *b*, sporidia.

Plate X.

53. *Meliola mollis*, B. & Br. *a*, ascus; *b*, sporidia; *c*, do. germinating; *d*, conidia; *e*, thread.
54. *Pisomyxa Amomi*, B. & Br. *a*, pycnidium; *b*, spore.
55. *Eurotium diplocystis*, B. & Br. Ascus with sporidia.
56. *a*, plant, magnified; *b*, threads and broken cyst; *c*, cyst clothed with flocci.

On the Subalpine Vegetation of Kilima Njaro, E. Africa. By J. D. Hooker, M.D., C.B., F.R.S., V.P.L.S., &c.

[Read June 19, 1873.]

I beg to offer to the Linnean Society a notice of a small collection of plants from the region skirting the snows of Kilima Njaro, the loftiest mountain as yet discovered in Africa, and the only one hitherto ascended in the tropical zone of this continent which exceeds in height the limits of perpetual congelation. The collection was formed at the request of my friend Dr. Kirk, H.B.M. Vice-Consul at Zanzibar, by the Rev. Mr. New, the enterprising African missionary, who was the first to reach the above limits. Coming from a previously wholly unknown region and elevation, it is, though very scanty, possessed of great interest.

Kilima Njaro is situated in lat. 3° 5′ S., long. 37° 22′ E., and about 150 miles from the shores of the Indian Ocean. It is described by Baron von der Decken, who twice ascended it, in 1861 and 1862 (once reaching 14,043 feet), as one of many summits that crown the eastern edge of the great plateau of equatorial tropical Africa, and of which some are said to be higher, but not so massive, while one is also said to be an active volcano. The elevation of Kilima Njaro, which is, I believe, also volcanic, though not active, was laid down by the Baron as 20,068 English feet and the snow-limit 16,400, though this is probably a variable position, depending on the season and annual fluctuations of climate. At the point to which Mr. New ascended, the snow lay in frozen masses like large sleeping sheep, in the month of August; above this it was continuous up to and over the dome-shaped summit of the mountain.

A small collection of plants was formed by the Baron, which is deposited in the Berlin Imperial Herbarium, where it will be described by Dr. Ascherson. Mr. New's collection was formed under every disadvantage. In his letter to Dr. Kirk* he states that he had no better materials for their preservation than a bundle of old 'Guardians,' and that most of the specimens he obtained were spoiled.

Dr. Kirk writes to me, in a letter which accompanied the collections:—" Mr. New, I must tell you, never dried a plant in his life before; but in sending him letters to the chiefs he would pass

* Proceedings of the Royal Geographical Society, vol. xvi. p. 167.

on his way, I asked him in return to do me the favour of cramming into any old book what he could of the highest vegetation of the mountain. You have the result in about fourteen species, more or less determinable, and indicating the same flora as that of the Cameroons. To look at the plants, they seem almost like my old Dzourba species that were lost on the way home: these were collected at 8000 feet, in lat. 18° S., which would make 12,000 feet under the equator; and probably plants do not reach on Kilima Njaro a higher elevation than that."

Happily Mr. New was not only gifted with perseverance, but with powers of observation which enabled him to give a sketch of the features of the vegetation on the flanks of the mountain in a manner which conveys much valuable information. In the above-mentioned letter he distinguishes seven regions of vegetation, describing them as follows:—

"i. The region of the Banana, Plantain, Maize, &c. This is the inhabited district of Chaga proper. The thermometer ranges between a maximum of 85° Fahr. and a minimum of 59° Fahr. Blackberries are abundant. The hills which are not cultivated are covered with a beautiful thick close turf exceedingly rich in clover.

"ii. Beyond this is a belt of thick jungle; it may have been cultivated in the past.

"iii. Above this is a vast forest of gigantic trees with a dense undergrowth of great variety, all thickly covered with moss, which gives to the forest the appearance of great antiquity. Here I met with such old friends as the Dock and common Stinging-nettle. Vines abound in great variety. On the higher verge of this forest the thermometer descended at night to 33° Fahr. In the evening a thick hoar-frost covered the leaves.

"iv. Higher still is a region of verdant hills, affording good pasturage for cattle. Clover plentiful.

"v. Beyond this all is heath, which dwindles away till you come to

"vi. The region of bare rocks and sandy wind-swept declivities, as clean and as smooth as a sea-beach. Then you reach

"vii. The everlasting snows, which thickly cover a magnificent dome as smooth in outline as the edge of the moon."

Of the lower regions here enumerated, the vegetation is probably similar in character to that of the hill-regions of the Zambesi, explored by Kirk in Livingstone's second expedition, and

of which large collections were formed and sent to Kew by himself and the Rev. Mr. Waller. In the fifth and sixth regions the only African standard is afforded by the mountains of Abyssinia, the Cameroon Mountains in western tropical Africa, the snowy heights of extratropical South Africa, and perhaps the Dzourba Mountains, as Dr. Kirk suggests. But as these last run only to 8000 feet elevation, their flora should not be so alpine as that of Kilima Njaro.

The three isolated mountain districts of tropical Africa form an isosceles triangles, of which the base, about 1500 miles long, runs nearly north and south from the Abyssinian Alps to Kilima Njaro; and the two sides stretching across the continent, one in a W.S.W. and the other in a W.N.W. direction, each being about 2000 miles long, unite these eastern points with the Cameroons in the Bight of Biafra. So far as is known, no land of equal height occurs at any intermediate point; and a comparison of their vegetation is therefore a very interesting study. Fortunately, from the Cameroon Mountains (altitude 13,100 feet) excellent materials were collected by Gustav Mann, which were published by myself in the seventh volume of our Journal (p. 171), together with those collected on the adjacent peak of Fernando Po (altitude 9469 feet) by the same enterprising traveller. The botany of the loftiest Abyssinian peaks has been explored by Schimper and other travellers in that country; but unfortunately, though contained in our collections, no account of them has hitherto appeared. In the above-mentioned paper I have compared the vegetation of the Cameroon Mountains with the Abyssinian, and have shown that out of 64 flowering plants contained in 56 genera, which occurred chiefly at elevations above 9000 feet, almost all the genera and no less than half the species are Abyssinian; whilst of the remainder of the species, many are clearly related to, or are obviously representative of, Abyssinian ones.

A still more curious fact brought out by that investigation was the number of European forms on both these tropical mountain regions, the Cameroon possessing 43 European genera and 27 species, 24 of these being common to Abyssinia and 22 natives of Great Britain.

These data would have led me to expect many additional temperate and even alpine plants from the loftier elevation of Kilima Njaro; but in this I have been disappointed; for Mr. New's col-

lection (consisting of about 50 species, of which 20 were collected in the region immediately below the perpetual snow) contains but few of the European forms found in the Cameroon and Abyssinian mountains, and no additional one whatsoever; while of the 22 British species found on those mountains, not one appears upon Kilima Njaro. Of the 20 plants from near the snow, the following are the most interesting:—

Adenocarpus. Identical with *A. Mannii*, H. f., from the Cameroons, with a variety.

Helichrysum, 7 species—2 identical with Abyssinian species, one of them a Cameroon Mountains' plant *.

Senecio, 2 herbaceous species.

An *Artemisia*, apparently the South-African *A. afra*, Jacq.

Two Ericaceæ, one a *Blæria* (probably identical with the Abyssinian species, *B. spicata*, Hochst.?), the other an *Ericinella*.

Bartsia, sp. Not in flower; near to, if not identical with, an Abyssinian species.

Protea, sp. Probably the Abyssinian.

Gladiolus abyssinicus, A. Brongn. A Monocotyledon of no significance.

Now the whole of these, except *Bartsia* and *Adenocarpus* (a Mediterranean and Canary-Island genus, occurring in Africa only on the Cameroons and Kilima Njaro), are South-African genera and very characteristic of that botanical region. This, taken in conjunction with the fact that the north temperate plants of Abyssinia are almost all absent in South Africa, suggests the view that, whilst South-African plants have migrated far north of the equator, European plants have not advanced correspondingly far to the south. In this there would be little noteworthy if the migration were in either case supposed to take place under existing climatic conditions; for the South-African genera mentioned above are characteristic of a warmer climate than the north temperate forms, and are therefore by so much better suited for advance into a tropical region than the north temperate plants would be. But it is very noteworthy in respect of the hypothesis that such migrations took place only, or chiefly, when the tropical zone was cooler than it now is; and so far as the southward migration of north temperate forms is concerned, this hypothesis is consonant

* One of the Helichrysums is probably an alpine form of the Natal *H. adenocarpum*, DC.; another, *H. Newii*, Oliver and Hiern, is nearest to the Cape *H. retortum*, Thunb.; a third is near the Cape *H. sordescens*, DC.

with so many otherwise unexplained phenomena, that it is with many naturalists an accepted truth.

It may be assumed that the northern forms did once spread over South Africa—the few existing on its Alps being evidence of such an invasion and the survivors of hordes that have been extinguished by the rapid diffusion and differentiation of preexisting South-African forms, which has resulted in a flora of extraordinary variety, richness, and generic and specific peculiarity. It may also be assumed that the migration of the peculiar South-African forms into Abyssinia and the Cameroon Mountains was subsequent to the northern one. I see no valid objection to this; it gains plausibility from a comparison of the temperate Australian flora (where a similar prevalence of endemic types and profusion of species is accompanied by a variety of north temperate genera and species in the subalpine zones) with the temperate American (Chilian and Fuegian) flora, where there is a paucity of endemic types and of species with a great infusion of north temperate genera and species. In short, it would imply simply that, though an area containing few types, and these endemic, may be successfully invaded by a few imported species (as is now the case in New Zealand, where peculiar species are being supplanted by European weeds), a change of conditions conducive to the rapid differentiation of the endemic types will turn the tables on the invaders, and limit their numbers if they do not exterminate them.

Whether justified or not in assuming the rarity of temperate plants in Kilima Njaro, the fact of the South-African character of its subalpine flora can hardly be questioned; and, taken in conjunction with the fact mentioned by Dr. Kirk of the similarity of the plants brought by Mr. New to those of the Dzourba, about 800 miles further south and nearly in the same longitude, it suggests the probability of the South-African flora being represented all along the high lands of western Africa from the Natal district to Abyssinia; and, further, seeing that most of the South-African plants found in the Cameroons are also natives of Abyssinia, it would appear probable that the migration of these to the Cameroons was by and through Abyssinia.

It is not obvious why none of the temperate European plants found in Abyssinia should in recent times have advanced south to Kilima Njaro and beyond it. Much may, as I have suggested in the case of the Cameroons, be due to the arid soil of

these mountains and to their limited area, but more perhaps to recent volcanic disturbances. Mr. Mann observed that some parts of the Cameroons presented evidence of subterranean heat—since which time the Cameroons have been in eruption on the grandest scale; and there can be no doubt that the scene of Mr. Mann's most interesting discoveries is now, in part at any rate, a mass of scoriæ, and that some of the endemic species he obtained may exist only in our herbaria, being burnt up in their native locality.

I will conclude with the hope that these fragmentary observations may prove of some use in calling attention to the great interest of the questions raised by even so small a collection as Mr. New's. They will at any rate afford some indication of the debt that science will owe to Mr. New when he again visits the scene of his labours, should he succeed in securing a more complete flora of the upper alpine regions of Kilima Njaro.

On the Marine Algæ of Barbadoes. By G. Dickie, M.D., F.L.S., &c.

[Read June 19, 1873.]

(Plate XI.)

The following notes of the Algæ of Barbadoes are founded on a collection sent to me by Governor Rawson, a good many of the species having been collected by Miss Watts; I have also seen a series from the same quarter belonging to Dr. J. E. Gray of the British Museum.

Lists of species from Barbadoes are worth recording, from the fact that irruptions of fresh water have been observed at the Island of Tobago, in the same line as Barbadoes and about 150 miles more to the south-west. The island alluded to is specially liable to such excessive flows of fresh water in the months of August, September, and October; the effects on marine life are shown by great numbers of *Echinida* &c. being cast on shore dead.

Governor Rawson has communicated remarks on this which are worthy of notice*. He states, "the outflows of the Orinoco and Amazons sweep round and form a swift current impinging on and passing by Tobago, carrying drift-wood, seeds, &c." It

* See 'Nature,' Dec. 19, 1872, and January 2, 1873.

is conjectured also that the rivers Essequibo and Demerara may assist in producing dilution of the sea in those quarters.

The distance between Barbadoes and Tobago being inconsiderable, and both being in a line from S.W. to N.E., it would be interesting to know whether the shores of the former are also affected by such flows of fresh water. The accompanying list of Marine Algæ seems to indicate the negative.

FUCACEÆ.

SARGASSUM VULGARE, *Ag.*

Geographical distribution. Tropical and subtropical coast of Atlantic; North America to shores of Long-Island Sound; Spain and Portugal; South Pacific.

S. FOLIOSISSIMUM, *Lamx.*

This is considered by some a variety of the former species.

S. CYMOSUM, *Ag.*

Geog. dist. Brazil.

S. BACCIFERUM, *Turner.*

Geog. dist. Tropical and subtropical ocean in both hemispheres.

DICTYOTACEÆ.

HALISERIS DELICATULA, *Lamx.*

Geog. dist. Brazil; Mexico; Ceylon.

H. PLAGIOGRAMMA, *Mont.*

Geog. dist. Brazil; W. Indies; Sandwich Islands.

H. JUSTII, *Lamx.*

Geog. dist. W. Indies.

PADINA PAVONIA, *L.*

Geog. dist. England; France; Spain; Mediterranean; Florida; Tropical Atlantic and Indian Oceans; South Pacific.

ZONARIA LOBATA, *Ag.*

Geog. dist. Canaries; Brazil; Florida; Cape of Good Hope.

DICTYOTA INDICA, *Sonder.*

Geog. dist. Havanna; Siam.

D. BARTYRESIANA, *Lamx.*

Geog. dist. Vera Cruz; Antigua; Florida; Indian Ocean.

D. CILIATA, *J. Ag.*

Geog. dist. Vera Cruz; Florida; Indian Ocean.

D. ANTIGUÆ, *Sonder.*

Geog. dist. Antigua.

D. PARDALIS, *Ktz.*
Geog. dist. W. Indies.

D. DENTATA, *Lamx.*
Geog. dist. Brazil; Antigua.

ASPEROCOCCUS SINUOSUS, *Roth.*
Geog. dist. Florida; Japan; Indian Ocean; Polynesia.

ECTOCARPACEÆ.

ECTOCARPUS PUSILLUS, *Griff.*
Geog. dist. South Britain.

RHODOMELACEÆ.

DICTYURUS OCCIDENTALIS, *J. Ag.*
Geog. dist. Mexico.

ACANTHOPHORA THIERII, *Lamx.*
Geog. dist. Spain? Florida; Mexico; Brazil; Indian Ocean; South Pacific.

A. MUSCOIDES, *L.*
Geog. dist. Angola; Florida; Brazil; Ascension.

BRYOTHAMNION SEAFORTHII, *Turn.*
Geog. dist. Mexico; Brazil.

B. TRIANGULARE, *Gm.*
Geog. dist. Florida; Brazil.

DIGENEA SIMPLEX, *Wulf.*
Geog. dist. Mediterranean; Red Sea; Indian Ocean; Florida.

POLYSIPHONIA FERULACEA, *Suhr.*
Geog. dist. Florida; Mexico; Australia; Indian Ocean.

LAURENCIACEÆ.

LAURENCIA SCOPARIA, *J. Ag.*
Geog. dist. Brazil.

L. PAPILLOSA, *Forsk.*
Geog. dist. Mediterranean; Red Sea; Florida; Mexico; Indian Ocean; S. Pacific.

L. OBTUSA, *Huds.*
Geog. dist. Britain; Mediterranean; Indian Ocean; Atlantic and Pacific, temperate and subtropical.

ASPARAGOPSIS DELILEI, *Mont.*
Geog. dist. Mediterranean; Canaries; S. America; Indian Ocean.

Corallinaceæ.

Corallina subulata, *Ellis & Soland.*
Geog. dist. Brazil; Indian Ocean.

Melobesia pustulata, *Lamx.*
Geog. dist. Britain; Mediterranean; North and South Pacific; Indian Ocean.

M. verrucata, *Lamx.*
Geog. dist. Britain; Mediterranean; Brazil.

Sphærococcoideæ.

Sphærococcus filiformis, *J. Ag.*
Geog. dist. Martinique.

Gracilaria confervoides, *L.*
Geog. dist. Scandinavia to Africa: Florida; Indian Ocean; Japan.

G. multipartita, *J. Ag.*
Geog. dist. England; Spain; Red Sea; New York to Florida; Brazil; California; Indian Ocean.

G. compressa, *Ag.*
Geog. dist. England; Mediterranean; Vera Cruz.

G. cornea, *J. Ag.*
Geog. dist. Pernambuco.

G. cervicornis, *Turner.*
Geog. dist. Gulf of Mexico; Brazil.

G. domingensis, *Sonder.*
Geog. dist. St. Domingo.

Gelidiaceæ.

Gelidium rigidum, *Vahl.*
Geog. dist. Indian Ocean; Pacific.

Solieria chordalis, *Ag.*
Geog. dist. France; Spain; New York to Florida.

Hypnea musciformis, *Wulf.*
Geog. dist. Mediterranean; Canaries; United States; Indian Ocean; N. and S. Pacific.

H. Rissoana, *J. Ag.*
Geog. dist. Mediterranean.

Helminthocladieæ.

Liagora pulverulenta, *Ag.*
Geog. dist. E. Indies.

GALAXAURA OBTUSATA, *Lamx.*
Geog. dist. Indian and Pacific Oceans.

G. ANNULATA, *Lamx.*
Geog. dist. Indian and Pacific Oceans.

G. RUGOSA, *Lamx.*
Geog. dist. Indian and Pacific Oceans.

G. PLICATA, *Ktz.*
Geog. dist. Indian Ocean; Santa Cruz.

G. MARGINATA, *Lamx.*
Geog. dist. Indian Ocean.

G. LAPIDESCENS, *Sol.*
Geog. dist. Mexico; Indian Ocean; Japan.

SPYRIDIACEÆ.

SPYRIDIA FILAMENTOSA, *Harv.*
Geog. dist. Britain; Spain; Mediterranean; New York; Red Sea; Indian Ocean; Australia.

CRYPTONEMIACEÆ.

CRYPTONEMIA LUXURIANS, *Mertens.*
Geog. dist. Brazil; Indian Ocean; Magellan's Straits.

CHRYSYMENIA UVARIA, *J. Ag.*
Geog. dist. Mediterranean; Brazil; China; Florida; Australia.

HALYMENIA LIGULATA, *Woodw.*
Geog. dist. Scandinavia; Britain; Spain; Florida; Indian Ocean.

H. FLORESIA, *Ag.*
Geog. dist. Mediterranean; Red Sea; Florida; Australia; Natal.

RISSOELLA DENTICULATA*, *Mont.*
Geog. dist. Peru near Payta.

CERAMIACEÆ.

CERAMIUM SUBTILE, *J. Ag.*
Geog. dist. Vera Cruz.

HALOPLEGMA DUPERREYI, *Mont.*
Geog. dist. Martinique; S. Africa.

SIPHONACEÆ.

CAULERPA PLUMARIS, *Ag.*
Geog. dist. Florida; Indian Ocean; Pacific.

* One specimen only, but agreeing in structure of frond, and having zonate tetraspores, resembling also the figure given by Kützing.

C. FALCATA, *Ktz.*
Geog. dist. Gulf of Mexico.

C. CLAVIFERA, *Ag.*
Geog. dist. Florida; Indian and Pacific Oceans.

C. CYLINDRICA, *Sonder?*
A small species about an inch in height, the specimens badly prepared, and added to the list with some doubt; Sonder's plant was from Algoa Bay.

RHIPILIA RAWSONI, n. sp. Sessilis, irregulariter lobata, lobis obtusis; cœlomata dichotoma, torulosa, apicibus obtusis subclavatis; color sordide fuscus; substantia coriacea, subtomentosa.

Differs from *R. tomentosa*, K., in colour and consistence, but especially in ramification and form of the filaments; from *R. longicaulis* in being sessile, many-lobed, and in the absence of hair-like points to the filaments.

Plate XI. Fig. 1. Natural size.
Fig. 2. Filament, highly magnified.

CODIUM TOMENTOSUM, *Stack.*
Geog. dist. Very general in both hemispheres.

HALIMEDA TRIDENS, *Lamx.*
Geog. dist. Florida.

H. OPUNTIA, *Lamx.*
Geog. dist. Mediterranean; Red Sea; Indian Ocean.

H. TUNA, *Lamx.*
Geog. dist. Mediterranean; Florida.

BRYOPSIS RAMULOSA, *Mont.*
Geog. dist. Cuba.

B. PLUMOSA, *Lamx.*
Geog. dist. General in temperate and tropical zones of both hemispheres.

VALONIACEÆ.

VALONIA VERTICILLATA, *Ktz.*
Geog. dist. Santa Cruz.

CHAMÆDORIS ANNULATA, *Mont.*
Geog. dist. Florida.

DICTYOSPHÆRIA FAVULOSA, *Dne.*
Geog. dist. Florida; Indian Ocean.

ULVACEÆ.

ULVA FASCIATA, *Delile.*
Geog. dist. Indian Ocean; California.

U. LATISSIMA, *L.*
Geog. dist. Widely diffused in both hemispheres.

ENTEROMORPHA COMPRESSA, *L.*
Geog. dist. Widely diffused in both hemispheres.

CONFERVACEÆ.

CLADOPHORA PROLIFERA, *Roth.*
Geog. dist. Azores; Mediterranean.

C. FASCICULARIS, *Mertens.*
Geog. dist. E. Indies.

C. MEMBRANACEA, *Ag.*
Geog. dist. Florida; St. Croix.

PHYLLODICTYON PULCHERRIMUM, *Gray*?
Very fragmentary and therefore recorded with doubt.

CHÆTOMORPHA AEREA, *Dillw.*
Geog. dist. Atlantic coasts of Europe; Canaries; United States; Australia.

C. TORTUOSA, *Dillw.*
Geog. dist. Atlantic shores of Europe; Mediterranean; United States.

This list comprehends 17 olive, 40 red, and 23 green, in all 80 species; of these 15 occur on the British coast, nearly one half on the shores of the United States, chiefly Florida, and more than 20 species have been found also in the southern hemisphere.

The following seem to be chiefly confined to the West Indies and Brazil:—*Haliseris Justii, Dictyota Antiguæ, D. pardalis, D. dentata, Dictyurus occidentalis, Bryothamnion Seaforthii, Laurencia scoparia, Sphærococcus filiformis, Gracilaria cornea, G. cervicornis, G. Domingensis, Caulerpa falcata, Cladophora membranacea.*

Notes on the Development of the Perigynium in *Carex pulicaris.* By W. R. M'NAB, M.D.

[Read April 17, 1873.]

AT the request of Mr. Bentham, I made a few observations on the development of the perigynium, or utriculus, of *Carex.* The

two species examined were *C. paludosa* and *C. pulicaris*; but in the present notes I shall confine my remarks to the latter. The study of the development of the perigynium in *C. pulicaris* shows conclusively that it is not developed in two pieces, but is a single structure. It is therefore impossible to regard it either as representing a perianth or stamens. In young spikes of *C. pulicaris* the regularly arranged bracts are very conspicuous. On removing one of the lower bracts, a single female flower is observed, situated apparently in the axil. If by careful dissection the anterior portion of the utriculus be opened by means of a fine needle, then the racheole will be brought into view, lying in front of the two styles. As the racheole is shorter than the utriculus, it is not visible until the latter is opened. A notch exists in the anterior margin of the utriculus. A careful examination shows that the racheole is a secondary axis produced in the axil of the bract. This secondary axis produces a bract (the utriculus) in the axil of which a very short tertiary axis develops, which is the female flower reduced to two carpels. On the prolonged secondary axis, or racheole, near the summit, two or three rudimentary flowers are observable, but apparently they very soon cease to develop. The perigynium seems to be equivalent to the sheath of the foliage-leaf, no lamina being formed, the notch on the anterior margin of the utriculus corresponding to the notch seen on the upper margin of the sheath of the foliage-leaf opposite the base of the lamina. This reduction of the leaf to the mere sheath depends on an arrest of development taking place before the lamina should appear.

The study of the development does not seem in any way to favour Mr. Bentham's view of the staminal nature of the perigynium; but my observations confirm those of Kunth, Gay, Röper, Schlechtendal, Wesmael, Caruel, and others, and are quite opposed to the views of Brown, Lindley, Schleiden, Payer, and their followers.

For an abundant supply of material for dissection, I am indebted to Dr. Moore, of Glasnevin.

April 2, 1873.

On the Perigynium and Seta of *Carex*.

By W. T. Thiselton Dyer, M.A., B.Sc., F.L.S.

[Read April 17, 1873.]

(Plate XII.)

At the request of Mr. Bentham I have, during the past season, made some observations with respect to the development of the female flower and its appendages in *Carex*. The species I selected as being convenient for examination was *C. acuta*. On March 15 I found female flowers from different parts of the spike present the appearances represented in figs. 1, 2, and 3. In the first the nucleus of the ovule, which is clearly the termination of an axis, is shown enveloped by two annular investments which at this stage, allowing for perspective, are circular and parallel. The outer of these is the first condition of the perigynium, the inner of the ovary. In the second and third figures there is little, if any, advance in the perigynium, while the ovarian annulus has become distinctly cusped, indicating the first appearance, in fact, of the two carpels. On March 26 I again examined the plant. There was but little change in the appearance of the female flower; but in one or two instances (fig. 4) I detected upon the anterior face within the perigynial annulus a minute body, which, I have no doubt, was the seta in a rudimentary form. On April 14 matters were much further advanced (figs. 5 to 8). The perigynium was now developed into a kind of sac about half as long as the ovary, including the stylar prolongations of the carpels (fig. 7). In most cases I could quite readily detect the presence of the seta. I was unable to thoroughly satisfy myself whether the perigynium was more deeply notched on the anterior side than on the posterior. I am inclined to think that it was so; but I am doubtful how far this may be accounted for by accommodation to the seta (figs. 5 and 6).

One flower, which I examined with great care, possessed an abnormal arrangement of great interest (fig. 8). Within the perigynium, the upper margin of which was much depressed in front, there was, besides the normal ovary, a rudimentary second flower consisting of a nuclear body subtended by a bract which was clearly deficient posteriorly, or with its edges connate low down and out of sight. I am inclined to think that the subtending bract represented the perigynium of the second flower. In the figures given by Professor Caruel (Ann. des Sc. Nat. 5me sér.

vii. t. 8. f. 1), of the earliest appearance of the female flowers (*épillets secondaires*), the condition is exactly similar.

I have anticipated, in what I have said above, my final conclusion that the seta is an axial structure. I arrived at this from the examination (April 14) of *C. pulicaris*. In this species the flowers are quite three times as large as those of *C. acuta* at the same stage; and their dissection is much more easily effected. The seta is easily seen on opening the perigynium (fig. 9), and obviously consists of an axis bearing rudimentary flowers. Towards the top there is always a bract placed anteriorly; and in the case shown in the figure the axis above this bract appeared to have branched. In almost every flower the details of this part of the seta are different. In fig. 10 I have represented another example as seen on the posterior side and more magnified.

I conclude therefore that the seta, being an axial organ, can never be homologous with a stamen; and in the case mentioned by Mr. Bentham ('Nature,' March 13, 1873, p. 373), where it bore an anther, I should compare it rather to a monandrous flower in *Euphorbia*.

Whether the perigynium, which under these circumstances cannot be regarded as perianthial or staminodial, is to be looked upon as composed of one or two bracts, I am somewhat doubtful. For the former view, to which on the whole I lean, there is to be urged the alternation with the glume and the tendency to be more deeply notched on the anterior than on the posterior side; this may be held to indicate union of the two edges. For the latter view the analogy of *Calyptrocarya*, which has two lateral glumes subtended by an anterior one, will count for something; there is also the undoubted difficulty of explaining the manifest bidentate nature of an organ which consists of a single part.

In conclusion I may add that in the early stages of growth the inflorescence is manifestly subject to enormous compression. This must necessarily produce some effect in modifying the development of the parts.

The male flowers of *C. acuta* which I examined, March 15, presented three stamens, all in the same plane and with connate filaments; on March 26 the middle one had been pushed outwards so as to occupy a position anterior to the two lateral ones.

EXPLANATION OF PLATE XII.

Figs. 1, 2, and 3. Female flowers from different parts of a spike of *Carex acuta* (March 15).

Fig. 4. Anterior view of the same (March 26).

5. Ditto ditto (April 14).
6. Posterior ditto (April 14).
7. Anterior ditto more advanced (April 14).
8. View, partly anterior, partly lateral, of a female flower of *Carex acuta* with a second rudimentary flower within the perigynium.
9. Anterior view of the female flower of *Carex pulicaris* (April 14). The perigynium has been opened, and the branched seta bearing rudimentary flowers drawn forward.
10. Posterior view of the apex of the seta from another flower (April 14).

On the Genus *Cinchona*. By John Eliot Howard, F.L.S. &c.

[Read May 1, 1873.]

"La manière de distinguer les espèces de *Cinchona* présente des difficultés qui ont souvent arrêté les botanistes. Ici, en effet, comme en d'autres associations très-naturelles de plantes, les caractères distinctifs *semblent osciller sur une échelle de variabilité*, dont les limites extrêmes ne sont point encore fixées avec une rigoureuse précision. Ces difficultés disparaitront *quand on sera d'accord sur les signes généraux qui constituent l'espèce*, et sur les degrés de variabilité organique qui séparent les individus. Mais, dans l'état actuel de la science, la nomenclature et le classement des espèces sont une affaire d'appréciation personelle, généralement abandonnée au courant des opinions particulières."—Triana, *Nouvelles Études sur les Quinquinas*, p. 26.

The genus *Cinchona* has been celebrated for the difficulty of classifying its species; and, notwithstanding all the amount of research recently bestowed, this desirable object does not yet seem to have been accomplished.

Two works, recently published on the subject, present the most striking contrasts. The first is by Dr. Weddell, the eminent Quinologist, who has before added so much to our knowledge of the species, and gives us in his 'Notes sur les Quinquinas' a contribution to the further elucidation of the subject, fraught with all the matured results of his long and personal acquaintance with the plants in question. It was first given forth in the 'Annales des Sciences Naturelles,' 5me Série, vols. xi. and xii., and afterwards published at Paris in 1870. The second work is entitled 'Nouvelles Etudes sur les Quinquinas,' par J. Triana, &c. &c., himself a native of one of the richest *Cinchona*-growing districts of South America, and a

gentleman to whose superior botanical knowledge it were superfluous for me to offer any testimony. Suffice it to say that I think all who are interested in the genus are much indebted to him for the many and very valuable observations contained in his work, as also for the representation to us of the elaborate Plates of Mutis, now for the first time brought before the scientific world. This work also bears date 1870, and was published at Paris. The state of political affairs had prevented any conference or comparison between the two distinguished authors*. Each treatise must be valued for its own merits. I shall have occasion in this paper to refer to and quote from both these publications, and to explain how far they support the views of classification which present themselves to my own mind.

To show what these are, I must refer to some "Observations on the present state of our knowledge of the genus *Cinchona*," which I presented to the Botanical Congress held in London in 1866.

In that paper I approached the subject "from a practical rather than from an abstractedly botanical point of view;" and I confess that it is a gratification to me to find that the views then put forth appear to have been not altogether uninfluential on the subsequent arrangements of at least one of the authors I have referred to. I am encouraged to hope that whatever may be true in these "Observations" will not be lost sight of in the future.

I there urged the study of the whole plant in its living state, not disregarding either the microscopical or chemical examination of the bark. This sentiment finds a full response in the notes of Dr. Weddell, but scarcely so in the work of M. Triana, who seems to me to rely too much on typical specimens as found in a dried state in our Museums. I believe that the number of real species of *Cinchona* is very much more limited than is supposed—and that between these species there exist a very large number of intermediate forms, which ought not to be considered so many different species, inasmuch as extreme inconvenience would thereby be caused, even if botanical distinctions existed between them.

In the conclusion of that paper I expressed "my opinion that every well-defined region of the Andes has its own prevalent and

* M. Triana's allusion to these events is as touching as it is simple, leading us to admire his perseverance in the work under such unfavourable circumstances.

characteristic *Cinchonæ*, generally found in varied aspects and *incapable of being reduced to any one typical form.* I do not think that any species has been clearly proved to prevail unchanged from end to end of the Cinchonaceous region, and I believe the plants which resemble each other in distant parts will be found analogous rather than identical."

I am confirmed in the correctness of this view of the genus both by seven years' additional observation, and by the testimony I have had of its correctness from those who could observe on the spot. But if proved correct, it must be highly influential on subsequent classification. Many so-called typical species will have to resign such exaltation, and to be classed as well-defined *forms* (varieties or, rather, races ?); and the whole arrangement will become more natural and less artificial*.

I must establish some of these statements by reference to the works in question.

M. Triana arranges his *Cinchonæ* under the head of thirty-six typical species. Dr. Weddell divides (with more truthfulness to nature, as I think) the genus into five grand divisions, to which he attaches the appellations Stirps I. *C. officinalis*; Stirps II. *C. rugosa*; Stirps III. *C. micrantha*; Stirps IV. *C. Calisaya*; Stirps V. *C. ovata*. Then follow the different branches, then the species, the subspecies, and varieties, with, again, varieties of these varieties.

Behind all this arises the important question whether the supposed typical species were really such or not. We have to do

* Dr. Weddell in subsequent observations confirmed this view of the subject, saying :—"I perfectly concur with Mr. Howard as to the great variability of the species of the very natural genus now before us—so much so, that, allowing for exaggeration, it might almost be said that all those described are but varieties or races sprung from one typical form. There is, in fact, no single one of them that can be distinguished from its neighbour by one absolute character; they can only be so by a certain *ensemble* which the eye may be unable to collect in an herbarium specimen. In these respects I believe a parallel may very well be established between *Cinchona* and many of our European genera. It is, then, to be expected that, as the number of specimens augments in herbaria, quinologists will have to contend with more than one difficulty arising from their peculiar tendency either to extend or restrict. And it must be evident to any one who has handled these polymorphous plants, that if the multiplying or splitting system be adopted, quinology must fall at last into an inextricable chaos." (See Report of Proceedings of the International Horticultural Exhibition and Botanical Congress, London, 1866, p. 222.)

with a genus which throws itself into a vast variety of permanent forms, as in the case of the willows and the roses; and if every one of these is to be called a species, there will soon be an end of all power of classification; for the different kinds would have to be counted by hundreds at the very least. Amongst these also it would be difficult to say which is the really typical form.

I think that I shall best be able to explain my own views, and my accordance or otherwise with those of these eminent botanists, by examining the arrangement of some of the more marked forms, and those respecting which we have the largest amount of information.

In the first place I will take the "*Quina primitiva*" or C. OFFICINALIS with its subdivisions.

In the 'Histoire Nat. des Quinquinas' Dr. Weddell ranged under the head *Cinchona Condaminea*:—

α. CONDAMINEA VERA.
β. *Candollii.*
γ. *lucumæfolia.*
δ. *lancifolia.*
ε. *pitayensis.*

In the 'Report of the Botanical Congress,' I proposed to class the *Loja* or Crown barks as

CINCHONA OFFICINALIS.

α. *Uritusinga.*
β. *Condaminea.*
γ. *Bonplandiana colorata.**
—— *lutea.*
δ. *crispa.*

omitting of course the *lucumæfolia*, *lancifolia*, and *pitayensis*, which would not fall in with my arrangement.

If these views are, as I think, correct, the barks of Loja may be fairly classed together thus as different forms of *Cinchona officinalis*; and this arrangement has been followed by Dr. Weddell in his most recent classification.

* Both the *macho* and *hembra* varieties are flowering with me whilst this paper is in press.

CINCHONA.

Stirps I. Cinchona officinalis.

Ramus A. *Euofficinales.*

C. officinalis, Linn., &c.

- α. *Uritusinga.*
- β. *Condaminea.*
- γ. *Bonplandiana.*
  - a. *colorata.*
  - b. *lutea.*
  - c. *angustifolia.*

*C. crispa, Tafalla.

This table is sufficiently elastic to take in some additional varieties, if, as is likely, such should be found to occur either in India † or in South America; and it leaves in a certain measure of obscurity, corresponding to our present state of knowledge, the relation of the *C. crispa* as a *subspecies*. I have published, from a MS. in the British Museum, the diagnosis of M. Tafalla, who makes the *C. crispa* a distinct *species* *. I must return to this question of *species* and *subspecies* presently.

If it should eventually prove that the *C. crispa* does not differ specifically from the other forms of the *Quina primitiva,* we shall have the Loja barks ranged very satisfactorily, to my mind, under the one head, as I proposed.

It will be seen that I have much reason to be satisfied with the evident approximation to the arrangement I submitted. It would not do justice to Dr. Weddell were I to omit his own statement of the case, to which I must now refer.

Dr. Weddell says (Ann. des Sc. Nat. ser. 5, vol. xii. p. 24):—" M. G. Planchon, qui a pu étudier la belle série d'échantillons de *Cinchona* de l'herbier Boissier, propose un autre arrangement des formes rapportées à ce type, et j'avoue que tout d'abord je me

* See 'Ill. Nueva Quinologia,' sub voce *C. Chahuarguera,* p. 3.

† I receive (whilst this is passing through the press) a letter from Mr. McIvor, with specimens of the bark (very promising in appearance) of " a hairy-leaved variety of the *C. officinalis,*" respecting which he adds:—" Dr. de Vry found the bark of this species to yield 10·67 of total alkaloids with 4·92 per cent. of crystallized sulphate of quinine. If under all conditions this bark is found to yield this amount of alkaloids, and especially quinine, it is certainly the best plant we can grow, being hardy and of rapid growth and perfectly free from canker and other diseases to which the Cinchonæ, especially the *Calisaya,* are liable." I should call this *var. δ pubescens,* H.

suis senti assez disposé à l'adopter. Si j'ai donné la préférence à celui de M. Howard, c'est qu'il m'a paru offrir des avantages pratiques qui compensent les quelques défauts qu'on pourrait lui reprocher."

I must be pardoned for observing that I have not yet any evidence to show that the *C. crispa* really merits the dignity of a subspecies; nor am I sure that the *C. angustifolia* is any other than an accidental variety wanting in those attributes of permanence which would be necessary to constitute it a race. This seems to be the opinion of Mr. M'Ivor. I find amongst the specimens from India two or more varieties, hitherto undescribed, which confirm me in this way of looking at the matter.

Tendency to reproduce the exact form in all its minutest particulars, and, on the other hand, tendency to diverge into remarkable varieties from the same seed, are both to be noted in this ramus A of the *euofficinales* of Dr. Weddell.

I now come to the arrangement of M. Triana, who, in the first place separates the *C. lancifolia* as a distinct species *. Then follows, as No. 2, *Cinchona crispa* with synonyms; and M. Triana remarks †:—

"On a cru voir dans le *Cinchona crispa* de Tafalla d'après les manuscrits de Pavon et la publication qu'en a faite M. Howard un synonyme ou une variété du *Cinchona officinalis*.

"Il est vrai qu'au premier aspect ces deux plantes se ressemblent beaucoup, mais nous croyons qu'il s'agit de deux espèces distinctes. Nous avons pu observer, en effet, dans les serres de M. Howard plusieurs jeunes plantes du *Cinchona crispa* placées à côté de celles du *C. officinalis*, et il nous a paru que même en l'absence de tous autres caractères, la contexture des feuilles du *C. crispa*, le développement remarquable de ses scrobicules &c. suffisait à le distinguer du *C. officinalis* et des espèces voisines."

With these observations of M. Triana I agree up to a certain

* Though not without difficulty; for he says (pp. 30, 31), "Malgré les nombreuses difficultés de cette tâche, une grande partie des espèces de *Cinchona* peut être facilement caractérisée. L'hésitation ne se fait sentir qu'en présence de quelques espèces de certains groupes dont les formes affectent des ressemblances plus marquées. Nous signalons ailleurs les rapports intimes qui rappochent, par example, le *C. lancifolia* et le *crispa* du *C. officinalis*. Nous y ajouterons le *C. chahuarguera*, comme étant l'espèce la plus voisine du *C. officinalis*, avec lequel elle risquerait aisément de se confondre par ses caractères distinctifs moins saillants.

† Page 58.

point; but I do not see that they prove the *C. crispa* to be a different *species*. My reasons for this will appear presently.

I have also to remark that the peculiar tissue (*contexture*) of the leaf is one of those diagnostic marks which disappear in dried specimens. It is well hinted at in the drawing of this bark in icon vii. of the 'Quinologie of Mutis.' The conspicuous scrobicules are represented in my 'Quinologia of Pavon.' They are correctly drawn and not exaggerated by Fitch.

Then follows, in M. Triana's classification, the *Cinchona officinalis* with its synonyms as No. 3 species. Then No. 4. *Cinchona chahuarguera* with the synonyms. M. Triana remarks:—

"Suivant une tradition ancienne, l'arbre nommé *Chahuarguera* par les Indiens de Loja aurait eu le privilége de fournir l'écorce fébrifuge dont l'emploi opéra la guérison de la Comtesse de Chinchon. Il existe d'ailleurs entre le *Cinchona officinalis* et le *C. chahuarguera* des ressemblances des plus grandes, mais on peut l'en distinguer par ses inflorescences moins lâches, par ses pédicelles plus courts, par ses fruits plus corsés, par ses feuilles elliptiques et plus consistantes, par les lobes du calice plus allongés," &c.

This is all very correct, I have no doubt; but if no difference or incompatibility exists in the organs of reproduction, I must still look upon them as one species.

I have studied this particular ramus rather more closely than most other branches, and see no reason to look upon one form more than another as the *typical* form or really *Quina primitiva*. I entirely agree with Dr. Hooker, and think that he has done good service to botanical science in restoring the name *C. officinalis* of Linnæus to the *Uritusinga* form—as this was unquestionably the "*Quinquina*" of La Condamine, and thus the first described. But the *β. Condaminea* of Weddell, or *Chahuarguera* of Pavon, is pretty certainly the sort which cured the Countess Chinchon, and, if I may judge from a specimen in my possession (and also from the icon xiv. of Mutis, the *Chahuarguera*, compared with icon xi., which is the *Uritusinga*), perhaps the finer plant of the two; whilst I might be inclined to prefer to both the var. *γ. Bonplandiana*, with its long-valued varieties the *colorata* and *lutea*, and with the recently found variety, the *angustifolia*, producing 10 per cent. of quinine from its bark—a truly noble kind, which was called in India *Cinchona mirabilis*. Perhaps Planchon is right, that in the *Chahuarguera*, and again in the *crispa*, the species verges towards *macrocalyx*. Nature, in fact, will not lie

in the Procrustean beds of our systems; and thus we have not a perfect isolation for our species of *C. officinalis*: but on the whole we have attained something by being able to say that the *C. officinalis* (in varied forms) is *the species* of Loja, whilst the *C. macrocalyx*, as we are told by Weddell, is the tree of Cuenca.

The Ramus B of Dr. Weddell, the *Macrocalycinæ*, are well separated from the *Euofficinales* by the character indicated in the floral organs; but I am unable to say whether the order of the branch will be confirmed or not. But little is known of several of the divisions, though in a commercial point of view they assume an increasing importance—especially the *C. Palton*, the description of which in the 'Nueva Quinologia' is, I understand, very correct; but I should be at a loss to distinguish any points in my *dried specimen* from Pavon to separate it from *C. macrocalyx*. Nevertheless the bark is wholly different, and, I doubt not, the tree also.

Ramus B. *Macrocalycinæ.*

C. MACROCALYX &c.

**C. Palton.*

**C. suberosa.*

**C. coccinea.*

**C. heterophylla.*

C. LUCUMÆFOLIA.

β. *stupea.*

C. LANCEOLATA.

This very nearly meets the views I expressed in 1866.

In Ramus C. of Dr. Weddell's 'Notes' I remark with great satisfaction that the *lancifoliæ* occupy a place by themselves. We have thus the special species of New Granada at length placed apart from that of Loja. I have not the opportunity of studying the living plants; but, as first described by Mutis and recently by Karsten, it must certainly seem to take its place among the first and most prominent species of *Cinchona*; and it will be observed that this, like the *officinalis*, presents itself before us in a number of variant forms.

Ramus C. *Lancifoliæ.*

C. LANCIFOLIA, Mutis &c.

α. *vera.*

β. *rubra.*

γ. *obtusata.*

δ. *Calisaya.*

ε. *discolor.*

From these must be abstracted the var. δ, if the information of M. Triana be correct, which I do not doubt; and I am inclined to think that some further forms must in time be added*. I can say nothing as to the inclusion of the *C. Forbesiana* and *C. amygdalifolia* under this branch. I suspect that the inflorescence of the former and its chemical contents may place it under the *micranthæ*.

As I have remarked above, M. Triana makes the *Cinchona lancifolia* his first species, and observes:—"On a souvent discuté au sujet du *C. lancifolia*, Mut. (restreint au Quinquina Tunita de la Nouvelle Grenade) soit comme espèce, soit comme variété du *Cinchona officinalis*. Nous avons donc longtemps hésité sur l'importance qu'il convient d'attacher à ces affinités et à ces différences, et dans notre catalogue de l'exposition de 1867, nous avions incliné à les considérer comme des variétés d'une même espèce. Il existe certainement de très-intimes affinités entre le *Cinchona officinalis* et le *Cinchona lancifolia*, Humb. Ces deux plantes se ressemblent à tel point qu'il est difficile de préciser leur distinction. Néanmoins, l'examen comparatif de documents plus complets nous permet de reconnaître qu'elles ne sont nullement identiques, et que les caractères tirés des feuilles, du fruit, de l'inflorescence, de l'écorce et de l'habitat, peuvent nous aider à les distinguer. En outre, au point de vue pratique, il est préférable de les mentionner sous les deux noms spécifiques qui leur sont attribués" †.

I have much satisfaction in considering the new aspect of the Stirps *C. rugosæ*. The first branch, the *eurugosæ*, comprehends the Pitayo sorts now made into the species *C. pitayensis* (and the subspecies *C. corymbosa* ? ‡), together with varieties. Dr. Weddell says (Annales des Sc. Nat. 5e série, tome xii. pp. 37, 38):—"Les renseignements que je possédais sur cette plante, lorsque je publiai ma Monographie étaient fort incomplets; je soupçonnais néanmoins, déjà, qu'elle devait constituer une espèce distincte (voy. *loc. cit.* p. 42). Les nombreux materiaux réunis depuis lors permettent à peu près aujourd'hui de compléter son histoire,

* Whilst this paper is passing through the press I am enabled to describe (to the Société Botanique of France), from specimens just received, a *varietas oblonga*, forming the "soft bark" of New Granada.

† I cannot despair of Quinology when I find three observers arriving by such different roads at one and the same conclusion, and agreeing in so *natural* a classification.

‡ Whilst correcting the press, I have a letter from Popayan, identifying the *C. corymbosa* (?) with the *C. lancifolia*, var. *discolor*, of Mutis.

et de lui assigner la place qui lui appartient dans la série de formes qui constituent le genre.

"Dans l'ouvrage cité, j'ai appelé l'attention (et pour la première fois, si je ne me trompe) sur l'existence des poils qui tapissent, chez certaines espèces, une étendue plus ou moins grande de la face interne du tube de la corolle, et je regrettai alors que le petit nombre de ces espèces ne permit pas de faire de ce caractère un moyen de sectionnement de genre. Eh bien! ce desideratum a presque cessé d'en être un, car M. Karsten a remarqué cette même particularité dans ses *CC. Trianæ* et *corymbosa*, et, tout récemment, je l'ai trouvée également dans le *C. pitayensis*, dont les deux plantes de M. Karsten paraissent être des formes."

Thus far Dr. Weddell, to whose testimony I am happy to add that of M. Triana, who includes all these forms under one head, that of *C. pitayensis*, the eighth species in his list.

In thus recognizing only one species in the barks of Pitayo, I think that he is right. I do not exactly see the connexion between the Pitayo plant and some of the others in Dr. Weddell's list. In *C. pahudiana* (Ramus B) I do not detect the above peculiarity in the interior of the corollas; in other respects there seems a considerable analogy to the *C. rugosa* and even to the *C. parabolica* in one or two of the divergent forms of this plant now growing with me from the same seed given me by the late Dr. Anderson.

It seems to me that the measure of separation from other species granted to the Pitayo barks, and their being almost all gathered into one sort, is a decided step forwards in Quinology.

It is not needful to my argument in this paper to notice each species or even each division of the Notes of Dr. Weddell. I adhere to what I have before said about the Huanuco barks; and passing over Dr. Weddell's Stirps *Cinc. micranthæ*, I venture to criticise the *C. Calisaya*, the special species of this eminent botanist, from whose "Notes" I take the following observations (Ann. d. Sc. Nat. ser. 5, vol. x. p. 353):—"Les difficultés qui se présentent dès l'abord à celui qui tente de grouper entre elles les formes déjà très-nombreuses de ce genre, résultent, à ce qu'il semble, des circonstances suivantes.

"1. Il n'y a aucun caractère botanique qui permette de sectionner le genre d'une manière utile.

"2. Sauf dans un très-petit nombre de cas, il est impossible de

distinguer nettement une espèce des espèces voisines, au moyen d'un seul caractère. Cette distinction ne peut être établie que par un ensemble de signes diagnostiques."

It is quite in accordance with these general remarks that the new classification of this branch should be more elaborate than the former. As given in the 'Histoire' we have only

CINCHONA CALISAYA.

α. *vera.*

β. *Josephiana.*

whilst the *C. boliviana* constitutes a distinct species.

I prefer the present arrangement :—

STIRPS IV. CINCH. CALISAYÆ.

C. CALISAYA.

α. *vera.*

a. *glabra.*

b. *pubera.*

β. *microcarpa.*

γ. *boliviana.*

a. *glabra.*

b. *pubescens.*

δ. *oblongifolia.*

ε. *pallida.*

*C. JOSEPHIANA.

a. *glabra.*

b. *pubescens.*

c. *discolor.*

*C. ELLIPTICA.

I should, however, be more entirely satisfied if I could see all the forms of *Calisaya* brought under the head of one species. I suspect, however, that the *C. elliptica* stands nearest to *C. purpurea*; and I do not see that the *C. Josephiana* differs more from the normal form than does the *C. boliviana*, both of which flourish with me.

It will not answer, practically, to confound the above two forms *C. Calisaya* and *C. Josephiana* together. The latter plant is worthless for cultivation, and could not be improved (so far as I

know) by mossing or any other expedient. It is, then, desirable and necessary that the botanist should lend his aid in discrimination; but how shall this be done?

In carefully considering Dr. Weddell's remarks on the *C. Josephiana*, I am led to conclude that the position of his *subspecies* is very nearly if not quite identical with that which I assign to race, he says (Ann. d. Sc. Nat. ser. 5, vol. xii. pp. 58, 59):—"La constance de la forme du *C. Calisaya* à laquelle j'ai donné le nom de *Josephiana* et en particulier son aptitude à se reproduire de semis, en conservant ses caractères (au moins pendant la première génération) m'ont engagé à la considérer plutôt comme une race ou une sous-espèce que comme une simple variété. M. Markham qui l'a etudiée dans la province péruvienne de Carabaya, pense que les caractères qui l'eloignent du Calisaya type sont dus plutôt à la hauteur à laquelle elle croît qu'aux autres conditions auxquelles elle est soumise. Il est en effet peu douteux que cette cause n'ait sa part d'action; mais ce que j'ai dit ailleurs de la configuration générale de quelques uns des districts où j'ai pu l'étudier, prouve au moins qu'elle n'agit pas seule.

"Les graines du C. *Josephiana* étant infiniment plus faciles à trouver que celles de la race forestière du *C. Calisaya*, la rusticité de la forme frutescente étant d'ailleurs beaucoup plus grande, il paraît en être résulté non-seulement que c'est cette dernière qu'on a soumis tout d'abord à la culture * mais, que c'est également sur elle qu'on porte les premiers essais de multiplication. L'expérience démontrera au bout de combien de générations les caractères de race s'effaceront: mais en attendant, on agira sagement en choisissant les éléments de multiplication du *C. Calisaya* sur des types de meilleur aloi, et de donner la préférence au bouturage sur le semis, afin d'éviter les perturbations qui pourraient résulter de l'hybridation."

With all this I agree entirely, with this exception, that I am not aware of any reason for supposing that any number of generations would efface the characteristics of this *race*; on the contrary, my impression is that it would be found recurrent amidst the produce of the seed of the purest varieties.

I have strong reasons for believing that I obtained the true *C. Josephiana* (as I have mentioned) amongst the produce of seed

* "C'est du moins ce que semblent démontrer les échantillons de provenances indienne et javanaise que M. Howard et moi nous avons eu occasion d'examiner."

from a genuine *Calisaya*. If so, I presume that it cannot be a distinct *species*. The cultivator of bark plantations is learning to avoid the plant, and will not be influenced by any value the botanist may assign to it to give it a higher place in his esteem.

But it is not this sort only which has to be avoided, as will be seen by the subjoined list of dried botanical specimens attributed to the *C. Calisaya*, which I happen to possess, and of which only a minority belong to the genuine plant.

1. A specimen, from Dr. Weddell, of the typical *C. Calisaya* in fruit.
2. Ditto, ditto, of *C. Josephiana*, in which the differences noted in leaf and fruit from No. 1 are apparent.
3. A specimen from Don Pedro Rada of the leaves of *Calisaya Zamba*, identified (as we shall see presently) with the *C. Calisaya*, var. *microcarpa*, of Weddell.
4. A specimen from Hasskarl of the same *C. Calisaya*, var. *microcarpa*. (India.)
5. Ditto?
6. A specimen of flowering branch of *C. Calisaya*, with pink flowers.
7. Ditto, with white flowers.
8. A glabrous specimen in flower marked *C. Calisaya, bark of inferior quality* (*C. Josephiana*.) (India.)

   [None of these Indian specimens correspond to the type No. 1.]
9. A specimen sent me by Mr. Broughton as a hybrid between *C. succirubra* and *C. officinalis*, but marked by M. Triana as the *Calisaya* of Weddell. The leaves do not coincide with the typical *C. Calisaya*.
10. A specimen from Dr. Hasskarl of the kind called by Miquel *C. Calisaya*, var. *rugosa* (" der Sendung Hasskarl's "). It has not the slightest resemblance to the typical *Calisaya*, but is remarkably like the *C. undata* of Karsten, of which I have a specimen. Still I do not affirm their identity. It is accompanied by bark having similar characteristics to some of that sent from Java as " *Calisaya*."

We have thus far only three specimens (Nos. 1, 3, 4) on which I can look with any confidence as representing the species as described by Dr. Weddell.

The following possess a separate place :—

1. A specimen of the *C. boliviana* in leaf (typical) from Dr. Weddell.
2. A specimen of the leaves of the *Cascarilla morada*, given me by Don Pedro Rada. Query the species ? and see the plate and description in the Journal of Botany, vol. vii. (1869).

These produce very fine *Calisaya* bark ; but how far they are related to each other, or how nearly allied to *C. Calisaya*, I am unable to say. I should perhaps have thought both these quite as distinct from the typical *C. Calisaya* as the *C. Josephiana.*

I must not omit mention of another specimen, although it has no pretension to a place in the genus *Cinchona.* This I received from Dr. Hasskarl with the inscription :—

> " *C. Calisaya* indigenorum Uchubambi verisimiliter erronee dicta arbor. In montibus altioribus prope Uchubambi, mense Julii 1853."

I am informed by Mr. Markham that this plant is called the "*Comadre de Calisaya*," because the Cascarilleros believe that where this is found they shall soon meet with the true *Calisaya.*

In order to show the difficulty of the subject, and to confirm the accuracy of that which I have written, I shall copy the statement of my friend Dr. Weddell himself, who says (Ann. d. Sc. Nat. ser. 5, vol. xii. p. 52) :—" Depuis la publication de cette espèce dans ma Monographie, quelques renseignements nouveaux sont venus s'ajouter à ce que nous avions déjà sur son compte, et doivent trouver place ici. Les uns sont le résultat d'observations faites dans le cours de mon second voyage en Bolivie, en 1851 ; les autres sont dus aux voyageurs qui ont visité plus récemment les districts habités par ce type. Mais nonobstant ces additions à nos connaissances, il est présumable que certains points de l'histoire du *C. Calisaya* seront, pendant longtemps encore, entourés de quelque obscurité, aussi bien par suite des difficultés mêmes que présente leur étude qu'à cause du peu de confiance que l'on peut avoir dans les documents de source indigène quand ils ne sont pas appuyés d'échantillons authentiques. Cette remarque est surtout applicable aux noms, une même designation étant donnée quelquefois, dans les localités différentes, à des variétés ou même à des espèces

très-dissemblables, et *vice versâ*. Ce que j'ai dit ailleurs sur la difficulté de caractériser les espèces du genre *Cinchona* d'une manière absolue trouve parfaitement son application ici, aucun des caractères diagnostiques du *C. Calisaya* n'étant tout-à fait constant. Est-ce, par exemple, le port que l'on envisage? On a, en regard du *C. Calisaya* type, qui est un arbre de haute futaie, la race ou la sous-espèce *Josephiana*, dont la taille ne dépasse pas celle d'un arbuste. Vient-on à comparer les feuilles, dont la forme typique est un obovale-oblong très-obtus? On en trouve qui sont oblongues-lancéolées et aiguës, ou bien ovales ou même elliptiques, et de consistance et de couleur variables. Étudie-t-on enfin les fruits, typiquement petits et à contour ovale? Il y en a dont la grosseur atteint la moyenne, et dont la forme tend à devenir lancéolée. Mais il n'y a peut-être aucun caractère qui offre plus d'inconstance que celui tiré de la présence des scrobicules; et comme il arrive que ce sont, aussi souvent, des formes ou variétés riches en alcaloïdes qui en sont privées, on a, par cet exemple, la mesure de la confiance que mérite ce caractère, en tant que significatif de telle ou telle constitution chimique de l'écorce."

I direct particular attention to what is said here in reference to the very varying aspect of the leaves in different kinds, corresponding exactly to the divergences which I find in my seedlings.

It appears, then, to have been an unfortunate bias which induced the early botanical labourers in this field to name many of the species after the shape of the leaves, as *cordifolia*, *lancifolia*, &c., since even on the same plant may be found at times much diversity.

Stirps 5. C. OVATA. Ramus A (Wedd.).

I now approach the consideration of the *Cinchona succirubra*, which is, equally with the species before considered, a kind presenting itself under a variety of distinct forms. These are well represented in the consignment of botanical specimens which I received in 1858 from America, and have described in my 'Nueva Quinologia.'

This is specially a species defined, as Dr. Weddell observes in another case, by characteristics drawn from the bark. In a note respecting *C. pitayensis*, var. *almaguerensis*, Dr. Weddell says (Ann. d. Sc. Nat. ser. 5, vol. xii. p. 41) :—" Voici, comme on voit, une variété établie sur des caractères tirés de l'écorce, et l'on a pu

remarquer que plusieurs autres membres des séries que renferme mon tableau ont une origine semblable. Il n'y a rien là qui doive étonner. Quand on songe, en effet, au rôle considérable de l'écorce dans le développement de la plante, pendant les diverses phases de son existence ; quand on a vu les nombreuses formes qu'elle est susceptible de revêtir ; quand, enfin, on prend en considération l'attention toute particulière donnée à cette partie par les quinologistes, on comprend qu'il y ait d'aussi bonnes raisons pour fonder des distinctions de rang sur son examen, que sur celui des feuilles ou de tout autre organe ; bien mieux encore, quand on est habitué à voir les caractères physionomiques et organiques appuyés par des différences correspondantes dans la constitution chimique. De nombreux précédents rendent, du reste, ces remarques presque superflues. Il suffirait de rappeler l'exemple de l'*Ulmus suberosa*, Ehrh., qui n'a été constitué en variété distincte de l'*U. campestris* qu'en raison du caractère particulier présenté par la partie en question."

M. Triana dwells on the therapeutic value of the Red Bark, and observes :—

"Il était donc naturel que la provenance d'une écorce si bienfaisante fût soigneusement recherchée. Mais la plante qui produit le Quinquina rouge demeura longtemps mystérieuse. Ce n'est que tout récemment que son origine s'est révélée, et c'est au zèle ardent de M. Howard que nous devons enfin des données positives sur ce point obscur de l'histoire naturelle des Quinquinas. Il publia, au mois d'Octobre 1856, dans le 'Pharmaceutical Journal,' une notice sur cette plante, et donna un dessin de ses feuilles d'après les exemplaires transmis par un habitant de l'Equateur qui exploitait précisément le Quinquina rouge. La localité où avaient été récoltés ces exemplaires correspondait aux indications fournies par M. Weddell sur la patrie probable de l'espèce, dans son 'Voyage au nord de la Bolivie,' publié en 1853, et concordait également avec les renseignements de Lambert sur le même sujet. Précédemment M. Howard avait déjà cru découvrir, dans l'herbier de Pavon, au Musée britannique, un véritable arbre de Quinquina *rouge*, désigné sons le nom de *Cascarilla colorada de Huaranda* ; puis à deux années de distance, à l'Université de Berlin, il trouva aussi dans l'herbier de Pavon un meilleur échantillon, d'après lequel M. Klotzsch fit alors une description soignée de l'espèce.

"Enfin, l'espèce reconnue distincte a été exactement identifiée avec une plante décrite dans les manuscrits de Pavon, sous le nom

de *Cinchona succirubra.* Elle vient d'être clairement exposée dans la splendide publication de M. Howard, intitulée *la Nueva Quinologia de Pavon.*"

On this quotation from M. Triana, which is historically correct, I have to remark that, though the plant which I figured in 1856 was true red bark, as shown by the wood and bark transmitted, at the same time it happened not to be of the typical form of leaf, but one verging more towards the *C. erythroderma* of Weddell. It was therefore but a step towards the solution of the question. There was also another difficulty in the way of tracing out the *C. succirubra*, owing to the great resemblance existing between the specimens of *C. colorada de Huaranda* and those of *C. cordifolia*, var. *rotundifolia.* Mutis represents it as a variety (only) of *C. cordifolia.*

I do not think it necessary to dwell longer on this branch, as I have given every information in previous papers published at different times, and also in Reports to the Indian Government, which are printed in the 'Returns.' I have only to express my regret that the cultivation of this Red Bark has been so widely extended. *It is not capable of becoming the quinine-producing tree of the future.* I have described its idiosyncrasy in my 'Quinology of the East-Indian Plantations,' and find by a recent letter from Mr. Broughton that I am right in my anticipations. Neither the plan of covering the branches with moss, nor that of stripping off the bark, will prevail to cause the *C. succirubra* to change its inveterate habit of producing Cinchonidine.

This does not diminish the value of the bark for the purposes of the druggist (as distinguished from the quinine-manufacturer); but in a commercial point of view it is different, as this particular alkaloid is so abundantly produced by inferior barks that no sale could be found for the quantity that could be prepared—unless, indeed, the Indian Government could be induced to substitute Cinchonidine for part of their supplies of Quinine, or the same course of action were followed by other nations. The Government of India have already rendered an essential service to medicinal science by the Commission which they appointed to test the relative value of the different alkaloids. It would seem but a very obvious sequence to such a Commission to encourage the consumption of that therapeutic agent which the plantations of India can now so abundantly produce.

I must here refer to the *C. rosulenta*, which I described in the

'Journal de la Société Botanique de Paris,' and which I take to be the source of the *Quinquina rose d'Ocana*, a tree the abundant produce of which in cinchonidine renders the bark of less value in the market. I take this to be the Red Bark of Ocana—and at present must regard it as a distinct species, though very nearly allied to *C. cordifolia*. The Red Bark which M. Triana describes, and of which he has seen specimens in the possession of Mr. Rampon, is (from the description) a wholly different bark, being the red variety of the *C. lancifolia*.

I cannot quit the subject of the Red Bark without expressing the gratification which I feel in the fresh light which M. Triana has thrown on the subject of the false Red Barks of New Granada, the source of the *Quina nova* or *Quina roja* of Mutis; which for a time supplanted the true kind in English medical practice, to the great detriment of the patients.

Here also we have, in an allied genus, the same tendency to present itself in several different forms, all of which may probably be reduced within the bounds of one species, the *Cinchona* (?) *oblongifolia* of Mutis, now classed under the genus *Buena* of Weddell. It is well described and figured by Karsten as *C. bogotensis*.

The genus *Cinchona*, in fine, appears to me to possess the characteristics both of great stability of organization, as shown in the different sorts which have been most studied, and also a remarkable tendency to variation in the product of the seed from the same capsules. Both these facts I have ascertained from actual observation, confirmed by the researches of others. For instance, as to the first mentioned, I possess carefully gathered specimens from the time of the earliest observers of the barks of different species. These also exist abundantly in the museums of Europe, and are known by all who have studied them to present the most exact resemblance to the barks grown in the present day, not only in outward features, but in minute and well-marked microscopical organization*, and in definite chemical contents, whether the place of growth be in their native mountains or in India. I was prepared to expect some evident and marked influence from the great alteration of climate; but, though liable in

* See Berg's 'Atlas' and my 'Quinologia.' I have interesting confirmation of this in a recent examination of some renewed bark of *C. succirubra* sent me by Mr. M'Ivor, reproducing the peculiar radial structure of the lax cellular tissue which is represented in my 'Quinology E. I. Plants,' and therewith the like rich contents in alkaloids.

both regions to singularly precise and well-defined changes from drought or moisture, from sunshine or shade, from difference in elevation above the sea-level, still on the whole the East-Indian plants appear to be the exact reproduction of those in South America. The character of the inflorescence and that of the general habit of the plant are equally permanent. I must refer to my published descriptions of three generations of the *C. officinalis*, one in South America, one partly in my stoves and partly in India, and one altogether in India, as one proof of the persistence of characteristics which I have been remarking. Many others might be given; but I think the truth of the observation will be recognized by all who have studied the *Cinchona*. As to what might be effected by a longer period of time, we seem to be without any thing to guide us. The practical deduction for those who are interested in the plantations is, that they may safely rely on this characteristic of permanence, and need not fear any mutability of structure or loss of their peculiar virtue in well-selected sorts. I think that this may be affirmed with safety.

But then comes into consideration the strange and, to me, inexplicable tendency to vary in the seed produced by the same plant, which is exhibited in the product of the capsules of the same botanical specimen sent as No. 6 from India. From this I raised one or more plants resembling the parent, but also another which appears to be exactly the No. 11 of the same consignment, this latter being a variety to which great importance has been attached on account of its yielding by far the largest amount of quinine of any yet known*. I do not think this can be regarded as a hybrid sort, but as a simple variety of the *C. officinalis*, var. *Bonplandiana*. The inflorescence, it seems, does not differ; and Mr. M'Ivor informs us that this admirable variety cannot be depended upon to come true from seed; so that the only certain mode of propagation is by cuttings. The seed of No. 11 might not improbably reproduce the No. 6. In other and quite different kinds of *Cinchona* I find the same tendency to variation; so that it would seem that each species must present itself under a variety of distinct but closely allied forms. I have found this to be the case with almost every kind which I have yet grown from seed, but with none more notably than with the produce of a particularly good form of the *Cinchona Calisaya* (var. *Ledgeriana*), from which

* *Subsequent Note* (Dec. 1873).—With exception of the var. *Ledgeriana*, which has yielded M. Moens equal to more than 12 per cent. of quinine. The numbers 6 and 11 refer to specimens in the Museum at Kew, of which mine are duplicates.

Mr. Broughton obtained the largest percentage of quinine met with in the bark of any form of the *Cinchona* in question. Of this he was good enough to send me by post a small packet of seed in April of last year. These soon germinated and gave me between 800 and 1000 seedlings. From amongst these I have reserved those which presented the greatest variation and which would certainly have been in old times accounted different species. Are these all, or any of them, hybrids? I scarcely think so, since it is pretty evident that a similar state of things prevails in their native woods, where (as pointed out by Dr. Weddell) cross-breeding between really different species must be of rare occurrence. If any one will look carefully into the researches of Pavon or any of the old botanists, or even of distinguished modern observers, such as Dr. Weddell, they will see that, however carefully the genus is divided into species, yet each of these species, when better known, is found under several forms.

The inquiry will of course arise whether this variation may not be due to the interference of the pollen of other species. If the peculiarity were at all isolated, I should perhaps incline to the opinion; but this seems to be set aside by facts. For instance, in this very species I have another example of similar variation, where hybridity seems improbable. An English traveller (Mr. Charles Ledger), whilst engaged in the project of transferring the Alpaca from Peru to Australia, obtained the information from his native shepherds respecting the best kind of *Cinchona*. After nearly four years' fruitless efforts, he learned that the trees of "Calisaya red bark" were in magnificent condition and promising for seed. An Indian and his son were sent as collectors into Caupolican and returned thence with the precious seed, which on July 22nd, 1865, was shipped from Arica to London. The export of these seeds was at that time prohibited, as this is one of the finest Calisaya-growing districts in Bolivia. The bag was nevertheless sent to Mr. C. Ledger in London; and I assisted at the negotiations which ended in its transference to India. The aspect of the capsules was that of the var. *microcarpa* of the *C. Calisaya*—that is to say, one of the best kinds. I recommended that the payment should be made dependent on the produce of at least 10,000 plants in India. The number was reached and exceeded; and since commencing this paper I have had the opportunity of learning from the purchaser himself (Mr. Money), who happens to be in the country, that the produce is as varied as that in my

stoves. I myself took a small handful as the reward of my assistance in the bargain, and found a like result in the produce. In the autumn of the year 1865 Mr. G. Ledger sold some portion of the seed to the Dutch Government; and the result has been most favourable to the prospects of the plantations in Java.

I have now growing variant forms of the *C. Pahudiana*, of the *C. succirubra*, and of the *C. officinalis* which bear no appearance of hybridity; but the extent of variability, though much insisted on by Mr. Broughton, I could scarcely credit till brought in so many different ways under my own observation.

In concluding this paper I wish to suggest as a legitimate inquiry whether, in reference to this family of plants, there is not a possibility of arriving at greater certainty as to the question of *species*, *subspecies*, or *race*. In other departments of scientific research, as in chemistry, we are accustomed to put questions to Nature and to extract answers with greater or less difficulty. I do not see why we should not do the same in this genus. I suppose that all naturalists are practically agreed, to a considerable extent, in the view which must force itself on the mind, that it is in the sexual organs we must find the boundaries which have been established by an all-wise Creator, and which the creatures cannot overstep. In the animal creation we have the phenomenon of sexual repugnance. In the vegetable kingdom we find incompatibility. Thus the varied features of the beautiful Cosmos around us are prevented from intermingling and reducing the aspect of things to a frightful chaos. The genera being thus kept apart, the species may, I suppose, be characterized by an inferior and yet marked amount of incompatibility; so that if two forms of a plant are so far incompatible in their floral organization that the result of the mixture of their essences would be an unstable (and therefore, I must presume, unnatural) hybrid progeny, there I think that I should be justified in terming them distinct species. In calling the progeny unnatural, I imply that they are not intended to continue, but to revert to one or other of the parent lines, or else to become extinct. I derived these views at first from the botanist Dr. Klotzsch, at Berlin, and subsequently find them so well expressed by M. Quatrefages, the President of the French Institute, that I may be permitted to copy his definition* in order to illustrate my meaning:—

"Pour moi, *l'espèce* est l'ensemble des individus plus ou moins

* 'Charles Darwin et ses Précurseurs,' p. 227.

semblables entre eux qui sont descendus ou qui peuvent être regardés comme descendus d'une paire primitive unique par une succession ininterrompue et naturelle de familles.

"La *variété*, ai-je dit, est un individu, ou un ensemble d'individus appartenant à la même génération sexuelle, qui se distingue des autres représentants de la même espèce par un ou plusieurs caractères exceptionnels. La *race* est l'ensemble des individus semblables appartenant à une même espèce, ayant reçu et transmettant par voie de génération les caractères d'une variété primitive.

"Ainsi l'*espèce* est le point de départ ; au milieu des *individus* qui composent l'espèce apparaît la variété ; quand les caractères de cette variété deviennent héréditaires, il se forme une *race*. Tels sont les rapports qui, pour tous les naturalistes, règnent entre ces trois termes, et qu'on doit constamment avoir présents à l'esprit dans l'étude des questions qui nous occupent.

"De là résulte premièrement que la notion de ressemblance, très-amoindrie dans l'espèce, reprend dans la race une importance absolue. De là il suit également qu'une espèce peut ne comprendre que des individus assez semblables pour qu'on ne distingue pas même chez eux des variétés, qu'elle peut présenter des variétés individuelles dont les descendants rentrent dans le type spécifique commun, mais qu'elle peut aussi comprendre un nombre indéfini des races."

The arrangement of the genus proposed by Dr. Weddell accords well with the above views of M. Quatrefages*, in accordance with which he has chosen the term *stirps*, which perhaps would be nearly equivalent to my *species*. His observations, which I now quote, seem to show this. He says (Ann. d. Sc. Nat. ser. 5, vol. xi. p. 354):—

"...... le nombre des formes composant le genre *Cinchona* paraît avoir constamment tendu à augmenter, et les chaînons de la série à se relier entre eux d'une manière si intime qu'on a bien pu se demander si tous n'étaient pas le résultat du développement

* "On peut se figurer les espèces dont le premier type n'a pas varié comme un de ces végétaux dont la tige est tout d'une venue et ne présente aucune branche, et les espèces à races plus ou moins nombreuses comme un arbre dont les branches mères se subdivisent en branches secondaires, un rameau en ramuscules plus ou moins multipliés. A travers quelques différences de langage, il est facile de reconnaître que tous les naturalistes s'accordent encore sur les points que je viens d'indiquer."

et de la variation d'une très-petit nombre de formes primitives* ou typiques. Telle était vraisemblablement l'opinion de Mutis; et c'est sans doute sous l'empire de cette idée que dans sa 'Quinologie,' il a admis deux types seulement parmi les espèces fébrifuges, les *C. lancifolia* et *C. cordifolia*, auxquels il rattache, comme variétés, toutes les autres formes qui étaient parvenues à sa connaissance."

I willingly give preference to the opinion of this distinguished botanist, and think the probability of several centres is greater than that of one such for the whole genus. In fact, the species do not lend themselves so easily as I once thought to the latter arrangement. I cannot find any probable centre from which the genus should spring; nor am I quite so certain as my friend Dr. Weddell as to the absolute definition of the circumference. The intermingling of characteristics seems to me more like the crossing of circles, some of which have their centre *outside* the genus.

I suppose that the above difficulties do not belong only to this genus, but beset us in many other directions when we seek to grasp (in a logical sense) the origin of species. It may be more satisfactory to recur to that which is before us, and to occupy ourselves rather with that which now exists than with some imagined previous state of things. For, as far as I see, there is nothing like the confusion which would result from indefinite and endless variation, nothing, again, like the survival of the best and the selection of favoured forms; but varieties spring up from seed without any assignable cause; and these, if they *happen* to be permanent, form definite races; so that the whole constitutes a highly variable unity, if I may call unity that which is but a part of the great whole, held in its appointed course by the agency specially of those two opposing principles called by Dr. Lucas† the law of imitation, which is "hérédité," and the law of *invention*, which this author calls "l'innéité‡" or *innate disposition to change*.

* In a note in the same page Dr. Weddell adds:—"Ou même d'une seule qui serait alors nommé, à juste titre, *Quina primitiva* 'The occurrence of these intermediate forms,' dit M. Howard dans l'introduction du bel ouvrage cité plus haut (p. vi), 'suggests the inquiry whether all the species of *Cinchona* have had but one and the same origin, and have varied by the influence of climate, soil, &c. into the many sorts which we now behold.' J'ai moi-même exprimé il n'y a pas longtemps (in 'Report of International Hort. and Bot. Congr.' p. 222) la même manière de voir; mais je crois que l'hypothèse de plusieurs types offre plus d'avantage au point de vue pratique."

† 'Traité philosophique et physiologique de l'Hérédité naturelle,' par le Dr. Prosper Lucas. Paris: 1847.

‡ Ibid.

Whatever may be the state of the case, it seems to me that we have at the present moment an opportunity which should not be lost for investigating and, if possible, settling some of the questions which have arisen. Mr. Broughton and the Indian cultivators are confident that hybrid varieties have arisen there, specially between *C. succirubra* and *C. officinalis.* Dr. De Vrij is equally confident that there has been a cross between *C. Calisaya* and *C. Pahudiana.* M. von Gorkom and others concerned participate (I believe) in this opinion; but I specially mention the first-named gentleman, because I think his analysis of the barks presents some added confirmation of the view.

The Indian Government have at their command the requisite means for putting this question to the proof, and for ascertaining which of the now numerous forms in its possession would yield real hybrids, and what are the laws which prevail in the reproduction of the races or varieties, and amongst them the variety *angustifolia*, so famed for its excellence*. It is impossible to say what might not arise in the way of practical suggestion, as well as of theoretic clearness of classification, from this new line of research; and if the Linnean Society were understood to be favourable to the investigation, I can scarcely doubt that the subject would be other than favourably entertained and beneficially acted upon. I am informed by a person practically conversant with the subject that the needed precautions might in his opinion be taken, and results that could be depended upon obtained. At all events we might expect to have the question decided whether or not the suspected hybrids in the Indian plantations are or are not such in reality.

* *Subsequent Note.*—Also of the *C. officinalis*, var. *pubescens*, and of the *C. Calisaya*, var, *Ledgeriana*, which may even surpass the one above mentioned. The var. *Ledgeriana* seems to be distinguished from the normal *C. Calisaya* both by its small and pure white flowers, and by its small capsules.

I learn from Mr. Broughton that the seed he sent me, and which produced so many varieties, "was gathered *from two trees* of the same red-under-leaved variety of *Calisaya*."

Supplemental Note on Buds of *Malaxis*.

By G. Dickie, M.D., F.L.S.

[Read November 20, 1874.]

(Plate XI.)

In a previous notice of the peculiar buds developed on the leaves of *Malaxis* I was unable to make any definite statement regarding the mode of development; and any conclusions founded on their structure could scarcely be regarded as final.

Early in July last (1873) I visited the locality where the former supply of *Malaxis* was got (at a later date in 1872); and the present brief notice is offered as supplementary. In the former communication the buds were described as consisting of a densely cellular body surrounded by a flask-shaped cellular coat, the latter open at the apex, the margin of the opening being at first more or less undulate and bilabiate, the whole presenting a general likeness to the ovules of any of our common Orchids. The membrane I surmised to be developed after the nucleus; this idea was founded on the relative proportions of sac and nucleus in different buds on the same leaf. I have now been able to trace the origin of each.

At first there is a mere papilla, which ultimately assumes a subspherical form; it is evidently not a mere projection from the epidermis, but a mass of parenchyma derived from the entire substance of the leaf. Subsequently the central part becomes denser and darker in colour; this is the first trace of the nucleus. The superficial layer then separates from the more central; this outer layer opens at the apex after the nucleus has made some increase in size; then this membrane grows rapidly and extends considerably beyond the included body, the opening at the top enlarges, and its margin becomes irregular and somewhat bilabiate; but more careful examination shows that this is owing to the presence of a sinus, or notch, at one side; finally the margin opposite to the lateral slit becomes produced into an evident lobe or leaf-like prominence.

To sum up:—The 1st stage is a subspherical papilla derived from the whole parenchyma of the leaf; 2nd, the central part of this becomes denser and darker in colour to form the nucleus; 3rd, the outer layer separates and opens at the top; 4th, this outer layer

grows rapidly, separates from the nucleus, extends beyond it, and becomes partially slit at one side; 5th, a leaf-like lobe grows out from the margin opposite to the slit.

So far, therefore, the bodies in question agree with the ovule in this: the nucleus appears first, and the coat next in order—both, however, being produced by differentiation from the same mass of parenchyma; whereas the general opinion regarding the ovule is that a papilla is first formed (the so-called nucleus), and afterwards one or two membranes are developed as cellular rings at the base of the former, and subsequently extend beyond it.

There is some difference of opinion regarding the ovules of orchids. Hofmeister thinks they are derived from single epidermal cells; Strasburger states that they originate by division of a cell beneath the epidermis, the latter becoming extended to form an outer layer, the former constituting the central part of the young ovule. The observations here recorded seem to agree with Strasburger's view; the buds of *Malaxis* are evidently not mere growths from the epidermis.

There appears, however, to be a similarity in the development of the hairs of certain plants (as *Echium*, *Malva*) and the spines and glands of *Rosa*, tissues under the epidermis contributing to their formation.

Professor M'Nab, in a brief notice on this subject (Journal of Botany, February 1873), remarks, "I suspect that there is only an *analogy* between the buds and ovules, the buds [of *Malaxis*] being ordinary adventitious buds, while the ovules are either leaf-structures or normal (not adventitious) buds."

This objection appears to be met by the fact that the *axillary* buds of *Microstylis*, a near ally of *Malaxis*, have a strong resemblance to those on the leaves of the latter.

I had hoped to observe whether, and in what way, these buds of *Malaxis* reproduce the plant. Living plants brought away and kept growing for a time in wet *Sphagnum* did not succeed, owing to various causes. The figure, Pl. XI. *fig.* 3, is a magnified view of the most fully developed bud observed (natural size about one twelfth of an inch in length); it shows the lateral slit in the external coat and the lobe (young leaf?) opposite to it; the two monocellular projections at the base may be probably rudimentary rootlets. In some of the buds there seemed to be a resemblance to the pseudobulb of the plant, with its lowest leaf or scale-like leaflet; the cellular coat, with lateral slit and finally developed

lobe, may perhaps indicate the homology of these bodies ; the outer membrane with its parts may correspond to leaf and leaf-sheath, the nuclear body to the pseudobulb.

On *Hydnora americana*, R. Br.

By J. D. Hooker, M.D., C.B., F.R. & L.SS.

[Read November 6, 1873.]

The publication by my friend Mr. Miers of a paper on *Hydnora americana*, R. Br., in the September Number of the 'Journal of Botany' (p. 257, t. 135 A), suggested the desirability of reinvestigating the structure of the original specimen of that remarkable plant which belonged to the Hookerian herbarium now at Kew, especially with the view of establishing its identity with the *Prosopanche* of De Bary, a point to which Mr. Miers has not alluded.

It was not without great hesitation that I reconciled myself to the necessity of cutting up the specimen in question. This arose from its bad state of preservation and very brittle nature, the expectation or hope of receiving better specimens from S. America (for which I had written to that country), the fact of its being the only authority for the species, and, above all, the recollection that this very individual had been under examination during many years devoted by Mr. Brown to that study of *Hydnora* and its allies which resulted in his magnificent contribution to the nineteenth volume of our Transactions. Nor will it surprise any one that it appeared to me to be most improbable that structures so remarkable as De Bary has described and figured* could, if at all recognizable, have escaped the sagacious scrutiny of Mr. Brown †. To doubt the latter seemed to me to be carrying scepticism to an extremity. On the other hand, I had myself in the then unpublished last volume of De Candolle's 'Prodromus' referred *Prosopanche* to *Hydnora americana*; and if Mr. Miers's observations were correct, this position became untenable. Under these circumstances, and being fortified by the interest taken in the sub-

* Abhand. der naturf. Gesellsch. zu Halle, Bd. x.

† Decaisne remarks that *Hydnora americana*, R. Br., has served De Bary as the type of his new genus *Prosopanche* (Bull. de la Soc. Bot. de Fr. 1873, compt. rend. p. 77). De Bary, however, although suspecting that the plants might be the same, dismissed the idea, owing to Brown's speaking of the margins of the perianth-segments as induplicate, and saying nothing about the staminal column.

ject by Professor Reichenbach, who was then at Kew, and by Professors Oliver and Thiselton Dyer, I intrusted the specimen to the skilful manipulation of the latter gentlemen, who have so conducted its dissection as not to have materially injured either its appearance or its scientific value.

I should mention that I had another motive for taking the subject in hand, which was that, in dealing with *Prosopanche* in the 'Prodromus,' I might not have attached that weight to Professor De Bary's views and observations which is due to so distinguished and accurate an observer and anatomist. And this has proved to be the case, the fact being that I relied too much on Brown's determination of the diœcious nature of *Hydnora americana.* I assumed that what are the ovuliferous placentas of a female plant in De Bary's specimen, were the homologues of non-ovuliferous tissue in Brown's. I could not understand the structure of the stigma as figured by De Bary, which I venture still to think is inaccurate or, at least, incomplete; and from his figure of the pollen-grains I judged that they might be effete, and hence his plant be functionally a female; lastly, his description and figures of the ovules plunged in the placental tissue and altogether confluent with it appeared to me to be so extraordinary and unique in the whole range of flowering plants, that I refrained from assigning it the importance which would have been its due had I not suspected some misapprehension. As it is, I hope to show, by the original specimen, that Professor De Bary's results are in all points, except the figure of the stigmatic surface, correctly established; and I have therefore to express my regret that full justice was not done to his labours in my monograph of the Rafflesiaceæ in the concluding volume of De Candolle's 'Prodromus.'

Comparing *Hydnora* with *Prosopanche*, the first point that calls for observation is the æstivation of the perianth-lobes. These are described by Brown as induplicate-valvate in *Hydnora africana,* and by De Bary as simply valvate in *Prosopanche.* In the 'Prodromus' I have described both as simply valvate. Of this there can be no question as regards *Prosopanche*; and in respect of *Hydnora,* my impression is, that Mr. Brown did not use the term induplicate-valvate in its strict sense as implying an involution or inflection of the whole margin of the adjacent segments when covered with their proper epidermis, but that he indicated thereby that remarkable inward growth of the inner of the two edges of the opposed surfaces of adjacent segments which necessi-

tates an intruded fold of the substance common to both at the commissures of the segments. Brown's expression is as follows:— "Marginibus veris late et oblique induplicatis, majorem partem disci apicemque omnino occultantibus" (*l. c.* 235). Now the margins of the perianth-segments in both plants are very thick, and touch by broad flat surfaces, which present on a transverse section an inner or axile and an outer or circumferential angular edge; of these, it is the inner that is protruded inwards in *Hydnora africana*, whence it follows that the segment is broader and thicker at the margin than at a short distance within it—a difference which does not occur in *Prosopanche*, a genus which further wants those singular central pulvini on the face of the segments that *Hydnora* possesses. The occurrence and disposition of cellular ramenta on the opposing surfaces of the segments in *Hydnora africana* favours this view, as does a comparison with what occurs in certain genera of Rubiaceæ with valvate corolla (as *Morinda*), and most remarkably in *Didymochlamis* (Hook. Ic. Pl. t. 1122), where the inner or axile edge of the margin is expanded into inflexed wings as broad as the lobes, so broad, indeed, that they become almost incumbent upon one another.

To De Bary's description of the structure of the staminal column I have nothing to add; the relation of its component parts to the perianth-segments and to the three staminodes situated in the neck of the perianth-tube below the insertion of the column is also accurately described by him. It is this neck of the perianth-tube which Mr. Miers regards as a 1-celled ovary; and he considers the staminodes themselves to be placentas covered with ovules. This has evidently arisen from the imperfection of his specimen, and from his having overlooked the three remarkable canals that are situated opposite the commissure of the perianth-segments, and which, being directed towards the longitudinal furrows on each staminode, lead downwards into the tube of the perianth. The structure of the tissues of the staminodes cannot be determined in the dried specimen. De Bary describes them as papillose; and it is conceivable that Mr. Miers, owing to the unfavourable circumstances under which he made his analysis, has mistaken the papillæ for ovules of that simple construction that obtains in many root-parasites. Analogy with other plants, and a consideration of the nature of these parts, would indicate that they secrete a fluid attractive to insects, which, descending through

the canals, would, as De Bary shows they do, convey pollen of its own or another plant to the stigma.

In the Kew specimen the tube of the perianth below the staminal column was choked with agglutinated sand-grains, which were removed with great care, exposing the stigmatic surface which forms the floor of the cavity, and a central erect hollow cone or ring occupying its axis and extending halfway up the tube. The base of this cone coincides with the circumference of the inner wall of the tube, and is continuous with it. After such an examination of its tissues as, owing to its brittle nature, I could make, I feel satisfied that this cone is a portion of the inner lining of the tube, which has become detached by contraction; and as no vestige of this structure appears in De Bary's figure, I incline to regard it as abnormal or accidental in its origin.

The floor of this cavity of the perianth-tube is formed by the stigmatic surface, which, however, I should not have recognized as such but for the aid of De Bary's analysis, the surface presenting no markings and the tissues being undistinguishable except by aid of microscopic sections prepared for me by Professor Thiselton Dyer. It is in the structure of the stigma that I find the only difference of importance between this specimen and De Bary's figure of *Prosopanche*. According to that figure (tab. 1. fig. 3, *st.*), the placental plates are continued uninterruptedly, and with the perfect regularity and parallelism of harp-strings, up to the floor of the perianth-tube below the staminodes, where they form an even level stigmatic surface: and there is no trace of a confluence of the plates into a distinct stigmatic body; in other words, the apparent tube of the perianth is represented as filled to within two thirds of an inch of the staminodes with closely packed placental plates, whose tops meet on a horizontal plane and form stigmatic surfaces. In the Kew specimen the stigma appears to form, on a naked-eye examination of a transverse section, an indurated horizontal body adherent to and continuous with the walls of the ovarian tube all round, and to the inferior surface of which the vertical placental plates are attached. Thin sections show that the placental plates are actually continuous to the stigmatic surface, but that their margins in a horizontal section become sinuous, and their tissues are much changed in character, especially from the presence of numerous masses of sclerogenous parenchyma similar to that which is so characteristically developed in the cortical portions of the perianth-tube.

The cavity of the ovary of the Kew specimen (into which Mr. Brown had made a large opening) is filled with the placentas so well described by De Bary, but contracted into thin brown plates of great density, toughness, and brittleness, studded with minute dark specks. Thin transverse sections of this placental tissue show that these dark specks are seeds, or ovules far advanced towards being seeds. They are spheroidal in form, being somewhat flattened in a direction perpendicular to the surface of the placental lamellæ, and ·018 in. by ·012 in. in diameter. They have a thin indurated periphery continuous with the placental tissue all round, and contain a loosely cellular tissue. This confirmation of De Bary's observation of the ovules being actually buried in and confluent with the placental tissue I regard as by far the most interesting point in the structure of this plant, and a discovery that may materially affect our hitherto received ideas as to the uniform development of the ovules of phanerogams.

It is not my purpose to dwell here on this curious fact, and I will only note two points in connexion with it:—1. Its possible bearing on the history of the early development of the ovule of *Primula* as described by Professor Martin Duncan, who, if I understand him right, discovered the embryo-sac in the peripheral tissue of the free central placenta before the ovule appears above the placental surface. 2. The necessity that it suggests of examining the ovules of *Hydnora* itself with a view to tracing their development. A careful consideration of the full-grown ovule of *H. africana* as represented in Bauer's splendid Plate, published in our Transactions, xix. t. 28. f. 12, 13, is not irreconcilable with the hypothesis that their integument is not homologous with the primine or secundine, but an extension of the substance of the placenta—and that the difference between the development of the ovule of *Hydnora africana* and *Prosopanche* is simply this, that in the latter the ovule is developed beneath the flat surface of the placental plates, and in *Hydnora* within papillæ arising from that surface. The nature of the curious cupule of the ovule in *Cytinus* will also require reconsideration under this view.

In conclusion, I would remark that no more striking instance of repetition of form under similar conditions in widely sundered localities occurs in the vegetable kingdom than this of *Hydnora* in the sandy regions of S. Africa, and *Prosopanche* in the similar regions of central temperate S. America. And if regard is paid to the amazing departures from the ordinary type of plants that

they display in common, the wonder is greatly increased. A more telling argument of its kind against the theory of evolution and in favour of that of creation in single centres cannot be found in nature. Great as are the resemblances of *Hydnora* and *Prosopanche*, their differences are so remarkable that it is difficult to suppose that plants locally so widely sundered should have had a common origin within a recent period of the world's history; and it is equally difficult to suppose that root-parasites such as these have had a very remote parasitic ancestry. Most other root-parasites are found associated with allied plants which are not parasitic.

Though, however, the idea of a direct evolution of *Prosopanche* from *Hydnora* may not be entertained in the present state of our knowledge, there are indications of an indirect one through the closely allied genus *Cytinus*, to which both *Prosopanche* and *Hydnora* are more nearly allied than to any other plants. Now species of *Cytinus* are natives respectively of both N. and S. Africa and of America. The genus has parietal placentas, which is the most prominent of the characters that separate *Prosopanche* from *Hydnora*; and it is hence conceivable that similarity of conditions may have determined the evolution of both *Prosopanche* and *Hydnora* from *Cytinus*, each in its own continent. It would much aid our conceptions in this matter were connecting links between these genera found in countries intervening between the habitats of each in its own continent. In Africa *Cytinus* advances as far south as the greater Atlas, almost to lat. 30°; and *Hydnora* is found in Abyssinia, and reappears in Angola. In America *Cytinus* has hitherto been found only in Mexico*, and *Prosopanche* only in Tucuman and E. Chili. In both continents the intervening area is explored but partially, and in respect of its root-parasites, which most collectors regard as fungi and not preservable, it is a *terra incognita*. I should also mention that the next nearest ally to *Hydnora* and *Prosopanche* is the wood-parasite *Apodanthes*, long supposed to be confined to America, where it occurs in Chili, Brazil, Venezuela, New Granada, and New Mexico, but of which one species has been found in Angola (where also two species of *Hydnora* occur), and another in S. Persia.

* Eichler (Bot. Zeit. 1872, p. 709) creates a new genus of Balanophoraceæ, *Bdallophytum* for *Cytinus americanus*, R. Br., which he describes anew as *B. Andrieuxii*, Eichl. A second species, *B. ceratantherum*, Eichl., is a new American *Cytinus*. Eichler has himself admitted his error in a short note appended to the concluding part of De Candolle's 'Prodromus,' xvii. p. 301.

There is still the alternative of a possible interchange of species between temperate S. America and S. Africa.

[In the Number of the 'Bot. Zeit.' published (Nov. 7) on the day following that on which this paper was read, Dr. Ascherson (p. 706) has given an account of his examination of Brown's type specimen of *Hydnora americana* in the Kew Museum during his visit to England some time previously, but when no analysis of it had yet been made. He remarks that "Miers's drawing resembles De Bary's so much that the suspicion can hardly be dismissed that the difference, apparently so great (in their description), depends on an erroneous interpretation by Miers of the organs in question. The placentas of this author have no resemblance to those of the African species of *Hydnora*, still less to those of *Prosopanche*, but are, on the contrary, much more like the staminodia represented by De Bary in the last species." Ascherson, however, finds no explanation of what Miers describes as ovules; although I think there can be no doubt that they are the staminodial papillæ.]

Extracts from a Letter from Osbert Salvin, F.R.S., to Dr. Hooker, V.P.L.S.

[Read December 18, 1874.]

Guatemala, Oct. 6, 1873.

* * * *

The first two months after our arrival were spent in this city, where I had to stay, arranging the business that brought me here. The wet season had only just commenced, and most of the vegetation was in a state of growth, and unfit for collecting; so we made no fair start till we got more into the country. The last two months we have spent at a hacienda on the slopes of the Volcan de Fuego; and here we have already got a good pile of dried specimens. The place is very favourably situated, being about 5000 feet above the sea-level; and within an easy ride is the volcano (13,000 feet high on one side), and the hot country stretching away to the Pacific Ocean. The rains are still heavy, so that we have not ventured far in either direction; but we have secured most of the flowering plants up to about 8500 feet and down to 3500 feet. But the ground requires constantly going

over; for every week brings out new flowers. The house where we stay has drying-stoves attached to it, used for drying cochineal. I am taking advantage of one of these for drying specimens, with excellent effect, so much so that I am not afraid of attempting Arums, Aroids, and Bromelias and other succulent families that I do not think could be dried in the wet season by any other than artificial means. There is not enough sun to counteract the general dampness of the rest of the day; and mould forms with great rapidity. I am marking every specimen with the locality, date, and altitude. These last I have been at some pains to get at accurately; and the plan I adopt gives, I think, good practical results. The barometer here varies very slightly, going through its diurnal range with remarkable regularity. Ten years ago I made a Table of readings at the sea-level for every quarter of an hour during the day. This Table I had an opportunity of testing on the voyage up the coast up from Panama, and find it very fairly accurate. From this I take my sea-level readings for calculating any height. I now make the height of Guatemala within 10 feet of what I did eleven years ago, and the same with other places. For plants, I observe, a few hundred feet makes little difference; and many range as much as 2000 or even 3000 feet. Still in birds I find I can make some useful generalizations from carefully observing their range in altitude; and I have no doubt the same will hold good for other branches of natural history. We have not touched the ferns, as Godman and I pretty nearly exhausted the district. But when we go to some fresh place I shall commence with them again. I feel rather inclined to pay special attention to Bromelias. There seem to be numbers of beautiful species; and just now they are beginning to bloom. My wife sketches the flowers; and the stove helps to dry the specimens. About the end of November we are going to a district where the mountains range from 9000 to 10,000 feet, and where there are some grand Pine forests composed of several species. I only once passed through this part of the country, and have always wished to see it again.

On the Algæ of Mauritius. By G. Dickie, M.D., F.L.S.

[Read November 20, 1873.]

Many years have elapsed since the late Prof. Harvey published a list of a small collection from Mauritius made by Mr. Telfair. I am indebted to Colonel Pike, United States Consul, for the species recorded here; he has been most assiduous in collecting and observing, and has thus contributed materially towards a knowledge of the geographical distribution of Algæ, both freshwater and marine.

The arrangement is that in 'Index Generum Algarum' by Prof. Harvey; Prof. Agardh's reformed classification of the Red Algæ has only recently come under my notice.

Fucaceæ.

Sargassum heterophyllum, *Turner*.
Geog. dist. Cape G. Hope; Natal.

S. polycystum, *Ag*.
Geog. dist. Cochinchina; Philippines; Singapore; Tond Island, Polynesia.

S. myriocystum, *J. Ag*.
Geog. dist. Hindostan; China Sea; Singapore.

S. ilicifolium, *Turn*.
Geog. dist. Cape Comorin; Macao; Philippines; Borneo.

S. subrepandum, *Forsk*.
Geog. dist. Red Sea.

S. linifolium, *Turn*.
Geog. dist. Mediterranean; Canaries.

S. bacciferum, *Turn*.
Geog. dist. Tropical and subtropical, both hemispheres.

Turbinaria ornata, *Turn*.
Geog. dist. Ceylon; Philippines; Singapore; Polynesia.

Sporochnaceæ.

Chnoospora implexa, *Hering*.
Geog. dist. Red Sea.

C. fastigiata, *J. Ag*.
Geog. dist. Mexican shores.

Dictyotaceæ.

Padina pavonia, *L.*, var. Fraseri.
Geog. dist. E. India; Bencoolen; Polynesia.

Zonaria variegata, *Lamx.*
Geog. dist. Canaries; W. Indies; Brazil.

Stœchospermum maculatum, *J. Ag.*
Geog. dist. Madras; Ceylon.

Dictyota Bartyresiana, *Lamx.*
Geog. dist. E. India; W. Indies.

D. indica, *Sonder.*
Geog. dist. Havanna; Siam; Palabuan.

D. obtusangula, *Harv.*
Geog. dist. Friendly Islands.

Asperococcus sinuosus, *Roth.*
Geog. dist. China Sea; Mediterranean; Brazil; Red Sea; Australia.

A. intricatus, *J. Ag.*
Geog. dist. Vera Cruz.

Hydroclathrus cancellatus, *Bory.*
Geog. dist. Red Sea; Singapore; Siam; Gulf of Mexico.

Chordariaceæ.

Dermonema dichotomum, *Grev.*
Geog. dist. ——?

Myriocladia capensis, *J. Ag.*
Geog. dist. Cape of Good Hope.

Ectocarpaceæ.

Sphacelaria tribuloides, *Meneg.*
Geog. dist. Mediterranean; Red Sea; Straits of Sumbawa.

Ectocarpus rufulus, *Ktz.*
Geog. dist. Mediterranean.

E. bombycinus, *Ktz.*
Geog. dist. Mediterranean.

E. capensis, *Ktz.*
Geog. dist. Cape of Good Hope.

E. spongiosus, n. sp. Filis decomposito-ramosis, in funiculos obtusos densissime implexis; ramulis brevibus, alternis, bifidis vel trifidis. Propagula?

The joints are about as long as broad, those of the ramuli a half longer than broad. The plant is dark brown, very sponge-like in habit.

Rhodomelaceæ.

Vanvoorstia spectabilis, *Harv.*
Geog. dist. Ceylon.

Martensia elegans, *Hering.*
Geog. dist. Natal; Southern, W. and E. Australia.

Amansia glomerata, *Ag.*
Geog. dist. Indian Ocean; Sandwich Islands.

Polyzonia jungermannioides, *Mart. & Her.*
Geog. dist. Red Sea; Indian Ocean; Australia.

Dictyomenia fraxinifolia, *J. Ag.*, var. madagascariensis.
Geog. dist. Indian Ocean; Ceylon; Madagascar; Australia.

Acanthophora Thierii, *Lamx.*
Geog. dist. Warmer parts of Atlantic; Mediterranean; Friendly Islands.

Digenea simplex, *Wulf.*
Geog. dist. Warmer parts of Atlantic; Mediterranean; Red Sea; Indian Ocean.

Polysiphonia secunda, *Ag.*
Geog. dist. Mediterranean; Gulf of Mexico.

P. corymbosa, *J. Ag.*
Geog. dist. Ceylon.

P. glomerulata, *Ag.*
Geog. dist. Indian Ocean; Japan; S. Pacific.

Bostrychia mixta, *H. & H.* ?
I have some doubt as to the identity of this.
Geog. dist. New Zealand; Cape G. Hope; Tasmania.

Laurenciaceæ.

Asparagopsis Delilei, *Mont.*
Geog. dist. Mediterranean; Canaries; S. America; Philippines; Tasmania.

Laurencia Forsteri, *Mont.*
Geog. dist. Bencoolen; Australia; Tasmania.

L. obtusa, *Huds.*
Geog. dist. Warmer parts of Atlantic; Mediterranean; Australia; Philippines; Tahiti.

L. PAPILLOSA, *Forsk.*
Geog. dist. Gulf of Mexico; Mediterranean; Red Sea; Australia; New Zealand; Sandwich Islands.

LOMENTARIA PARVULA, *Ag.*, var. VAGA, *Ktz.*
Geog. dist. United States; Britain; Mediterranean; Akaroa in Southern Ocean.

CHAMPIA COMPRESSA, *Harv.*
Geog. dist. Cape of Good Hope.

CORALLINACEÆ.

CORALLINA FLABELLATA, *Ktz.*
Geog. dist. Cape of Good Hope.

C. PEDUNCULATA, *Lamx.*
Geog. dist. Australia.

C. PLUMIFERA, *Ktz.*
Geog. dist. Australia.

JANIA ANTENNINA, *Ktz.*
Geog. dist. Australia.

J. TENELLA, *Ktz.*
Geog. dist. Gulf of Mexico; Mediterranean.

CHEILOSPORUM CULTRATUM, *Harv.*
Geog. dist. Brazil; Port Natal.

AMPHIROA ANCEPS, *Ktz.*
Geog. dist. Cape of Good Hope.

MELOBESIA PUSTULATA, *Lamx.*
Geog. dist. Britain; Mediterranean; Japan.

M. VERRUCATA, *Lamx.*
Geog. dist. Britain; Mediterranean; Brazil.

SPHÆROCOCCOIDEÆ.

DELESSERIA LEPRIEURII, *Mont.*
Geog. dist. Guiana; New York to Florida; Apalachicola.

DESMIA AMBIGUA, *Grev.*
Geog. dist. Shores of E. India.

GRACILARIA DURA, *Ag.* ?
The specimens are not in fruit; I have some doubt as to identity.
Geog. dist. Mediterranean; E. India.

G. CORTICATA, *J. Ag.*
Geog. dist. Shores of Hindostan; Ceylon.

GELIDIACEÆ.

*GELIDIUM RIGIDUM, *Vahl.*
Geog. dist. Gulf of Mexico; Red Sea; Indian Ocean; Pacific at Tahiti, &c.

G. CORNEUM, *Huds.*
Var. *crinale.*
Geog. dist. In various forms, in both hemispheres.

G. INTRICATUM, *Ag.*
Geog. dist. Sandwich Islands.

G. ASPERUM, *Mert.*
Geog. dist. Australia; New Zealand.

SUHRIA PRISTOIDES, *Turn.*
Geog. dist. Cape of Good Hope.

S. VITTATA, *L.*
Geog. dist. Brazil; Moluccas; Cape G. Hope.

HYPNEA MUSCIFORMIS, *Wulf.*
Geog. dist. Canaries; Brazil; Mediterranean; Cape Comorin; Pacific Ocean.

H. SPICIFERA, *Suhr.*
Geog. dist. Cape G. Hope.

H. CORNUTA, *Lamx.*
Geog. dist. Gulf of Mexico; Cochinchina; Manilla.

H. DIVARICATA, *Grev.*
Geog. dist. Gulf of Mexico; Philippines; Australia.

H. VALENTIÆ, *Turn.*
Geog. dist. Red Sea; Philippines.

H. PANNOSA, *J. Ag.*
Geog. dist. Mexican shores.

H. HORRIDA, *Ag.*
Geog. dist. Seems peculiar to Mauritius.

EUCHEUMA HORRIDUM, *Harv.*
Geog. dist. Mauritius only?

* *Echinocaulon spinellum*, Ktz., in some measure is near to this, if not identical.

E. SPINOSUM, *L.*
Geog. dist. Sumatra; Cape of Good Hope.

HELMINTHOCLADIEÆ.

LIAGORA GALAXAUROIDES, n. sp. Fronde tereti, superne subcanaliculata, ramosissima, fastigiata; crusta calcarea crassa, continua; apicibus acutis, breviter furcatis.

I have only seen two or three specimens; but the plant has an aspect different from any species known to me; the colour is mostly pale red.

L. OBTUSA, n. sp. Fronde subcompressa, dichotomo-decomposita; ramulis obtusis, subclavatis.

L. LURIDA, n. sp. Fronde lurida, parce ramosa, ramis longe attenuatis; crusta calcarea fere nulla.

L. CRASSA, n. sp. Fronde crassa, compressa, subpinnatim ramosa; ramis brevibus, crassis, superne attenuatis*.

L. DISTENTA, *Mert.*
Geog. dist. Madeira; Mediterranean: Australia.

L. COARCTATA, *Zanard.*
Geog. dist. Red Sea.

L. PULVERULENTA, *Ag.*
Geog. dist. Gulf of Mexico; E. India.

GALAXAURA FASTIGIATA, *Dne.*
Geog. dist. Philippines; Timor.

G. LAPIDESCENS, *Lamx.*
Geog. dist. Canaries; Red Sea; Madagascar.

G. CANALICULATA, *Ktz.*
Geog. dist. Gulf of Mexico.

G. RUGOSA, *Lamx.*
Geog. dist. Gulf of Mexico; Polynesia.

G. PIKEANA, n. sp. Fronde complanata, rugosa, continua, dichotoma; segmentis superioribus fasciculatis, dense congestis, apicibus furcatis obtusis.

This plant has a habit very different from any known to me; the specimens are here and there a pale red—probably the original tint, which in drying fades to straw-yellow. I have

* Dr. Hooker kindly forwarded the species in Kew Herbarium; I could see none identical, so far as I could judge, with the forms described here.

named it after Col. Pike as some acknowledgment of his zeal in several branches of Natural Science.

ACTINOTRICHIA RIGIDA, *Dne.*
Geog. dist. Red Sea; Philippines; Madagascar; Sandwich Islands.

RHODYMENIACEÆ.

PLOCAMIUM COCCINEUM, *Huds.*
Geog. dist. Widely diffused in both hemispheres.

P. TELFAIRIÆ, *Harv.*
Geog. dist. Mauritius only.

P. CORNUTUM, *Turn.*
Geog. dist. Cape of Good Hope.

SPYRIDIACEÆ.

SPYRIDIA FILAMENTOSA, *Wulf.*
Geog. dist. United States; Britain; Mediterranean; Red Sea; Australia; Tasmania.

CRYPTONEMIACEÆ.

GYMNOGONGRUS CORYMBOSUS, *J. Ag.*
Geog. dist. Cape of Good Hope.

G. GLOMERATUS, *J. Ag.*
Geog. dist. Cape of Good Hope.

G. VERMICULARIS, *Turn.*
Geog. dist. Chili; Cape of Good Hope.

G. CAPENSIS, *J. Ag.*
Geog. dist. Cape of Good Hope.

CALLOPHYLLIS DISCIGERA, *J. Ag.*
Geog. dist. Cape of Good Hope.

C. ALCICORNIS, *J. Ag.**
Geog. dist. Australia.

KALLYMENIA DENTATA, *Suhr.*
Geog. dist. Cape of Good Hope.

GIGARTINA FASTIGIATA, *J. Aq.*
Geog. dist. Cape of Good Hope.

G. CHAPMANI, *H. fil. & Harv.*?
Geog. dist. New Zealand.

* This is probably identical with *C. acrodonta*, Ktz.

GRATELOUPIA FILICINA, *Wulf.*

Geog. dist. Britain; Canaries; Mediterranean; Hindostan; Java; Cape of Good Hope.

CERAMIACEÆ.

CENTROCERAS CLAVULATUM, *Ktz.*

Geog. dist. Widely distributed in both hemispheres.

HORMOCERAS VARIEGATUM, *Ktz.*

Geog. dist. Shores of S. America.

H. DECURRENS, *Ktz.*

Geog. dist. South Britain; Mediterranean.

CERAMIUM DIAPHANUM, *Lightf.*

Geog. dist. North Atlantic; Cape of Good Hope.

HALOPLEGMA DUPERREYI, *Mont.*

Geog. dist. Shores of S. Africa.

GRIFFITHSIA SECUNDA, *Harv.*

Geog. dist. Cape of Good Hope.

G. CORALLINA, *Lightf.*

Col. Pike's specimens are barren, and more delicate than the ordinary form.

Geog. dist. Britain; United States; New York to Florida; Mediterranean.

CALLITHAMNION PYGMÆUM, *Ktz.*

A very minute species, on *Chætomorpha clavata.*

Geog. dist. Adriatic.

SIPHONACEÆ.

CAULERPA CLAVIFERA, *Ag.*

Geog. dist. Red Sea; Gulf of Mexico; Philippines.

C. DENTICULATA, *Dne.*

Geog. dist. S. and W. Africa.

C. NAJADIFORMIS, *Bory.*

Geog. dist. Caroline archipelago.

C. PLUMARIS, *Ag.*

Geog. dist. Venezuela; Indian Ocean; Red Sea; Pacific.

C. PECTINATA, *Ktz.*

Geog. dist. La Guayra.

C. PELTATA, *Lamx.*

Geog. dist. African and American shores.

C. SCALPELLIFORMIS, *Ag.*
Geog. dist. E. Africa; Australia.

UDOTEA SORDIDA, *Mont.*
Geog. dist. Philippines.

CODIUM TOMENTOSUM, *Huds.*
Geog. dist. Widely diffused in both hemispheres.

C. ADHÆRENS, *Ag.*
Geog. dist. Both hemispheres.

VAUCHERIA.
Two species from fresh water, both too imperfect for recognition.

BRYOPSIS CÆSPITOSA, *Suhr.*
Geog. dist. S. Africa.

DASYCLADEÆ.

NEOMERIS ANNULATA, n. sp. Breviter stipitata, cylindrica, apice acuta; transverse annulata, granulata.

A few specimens only. Having been preserved in spirits, the natural colour is unknown. In height about one inch by two-tenths broad. Evidently different from *Neomeris dumetosa*, Lamx., and *N. nitida*, Harv.; from the former, to which it is nearest, it differs in size, form, and arrangement of the calcareous granules.

ACETABULARIA CALYCULUS, *Q. & G.*
Geog. dist. Australia.

VALONIACEÆ.

VALONIA FILIFORMIS, n. sp. Cæspitosa, cœlomatibus intricatis, filiformibus, simplicibus vel basi subramosis.

Filaments one to two inches long, near to *V. pusilla*, which has the ends dilated.

V. FASTIGIATA, *Harv.*
Geog. dist. S. Pacific.

V. CLADOPHORA, *Ktz.*
Geog. dist. New Caledonia.

MICRODICTYON AGARDHIANUM, *Dne.*
Geog. dist. Red Sea; S. Pacific.

CHAMÆDORIS ANNULATA, *Mont.*
Geog. dist. Gulf of Mexico.

DICTYOSPHÆRIA FLAVULOSA, *Ag.*
Geog. dist. Gulf of Mexico; Indian Ocean; Sandwich Islands.

ULVACEÆ.

ENTEROMORPHA COMPRESSA, *L.*, var. TRICHODES, *Ktz.*
Geog. dist. In various forms widely diffused in both hemispheres.

U. LATISSIMA, *L.*
Geog. dist. Both hemispheres.

TETRASPORA GOODEYI, *De Breb.*
Geog. dist. Mountain streams.

I have compared Col. Pike's plant with authentic specimens from France, and can see no difference, excepting that the cellules of the former are ·0005, those of the latter ·0007 of an inch.

BATRACHOSPERMEÆ.

THOREA VIOLACEA, *Bory*?

The plant from Mauritius was described by Bory as unbranched; some of Col. Pike's specimens are almost simple, these have the appearance of being old and imperfect; most, however, are much branched; in all, the joints are from two to three times as long as broad. British specimens of *T. ramosissima* from river Thames, I find, have the joints from five to six times as long as broad. Rabenhorst describes the continental plant as having joints from two to three times as long as broad, which in this respect therefore differs from the British plant, but agrees with that from Mauritius.

CONFERVACEÆ.

DRAPARNALDIA PULCHELLA, *Ktz.*

Some consider it a form of *D. plumosa*, which is widely distributed in Britain &c.

STIGEOCLONIUM LUBRICUM, *Ktz.*
Geog. dist. Common in Europe.

SPONGOCLADIA VAUCHERIÆFORMIS, *Aresch.*
Geog. dist. Mauritius only?

CLADOPHORA VALONIOIDES, *Sonder*?

If not identical, certainly a near ally.
Geog. dist. Australia.

C. ECKLONI, *Suhr.*
Geog. dist. Cape of Good Hope.

C. ALBIDA, *Ktz.*
Geog. dist. Various shores of Europe and of United States.

C. PINNATA, n. sp. Pinnatim ramosa, ramulis secundis, 1–2 articulatis, articulis diametro 5–8plo longioribus, subcylindricis.

Cæspitose, rigid, 1–2 inches long, very dark green.

In fresh water, chiefly on shells of living *Melania spinulosa* and *M. erythrostoma.*

C. PANNOSA, n. sp. Dense pulvinata, inferne subramosa, superne irregulariter ramellosa, ramulis brevibus, articulis diametro 2–3plo longioribus.

In fresh water, forming dense ragged tufts of a dark green colour; it belongs to the subgenus *Ægagropila.*

C. AFRA, *Ktz.*

In fresh water.

Geog. dist. Cape of Good Hope.

CHÆTOMORPHA JAVANICA, *Ktz.*

Geog. dist. Java.

C. CLAVATA, *Ktz.*

Geog. dist. S. Africa.

C. RESTRICTA, *Suhr.*

Geog. dist. W. coast of S. America.

C. ÆREA, *Dillw.*

Geog. dist. Atlantic coasts of Europe; Mediterranean; Canaries.

HORMOTRICHUM DELICATULUM, n. sp. Marinum; viride, capillaceum, articulis diametro subæqualibus.

Bright green, very delicate in habit, filaments ·0004 of an inch in diameter.

OSCILLATORIACEÆ.

CALOTHRIX BREBISSONII, *Ktz.*?

Seems nearly allied to, if not identical with, the French plant so named.

LYNGBYA MAJUSCULA, *Dillw.*

Geog. dist. Britain; Florida; Celebes.

L. ANGUINA, *Mont.*

Geog. dist. Bencoolen; Tond Island.

L. CANTHARIDOSMA, *Mont.*

Geog. dist. Canary Islands.

L. FLUVIATILIS, *Mert.*

Geog. dist. Borneo.

L. OLIVACEA, n. sp. Trichomatibus olivaceis, distincte articulatis, articulis diametro 3–4plo brevioribus; vaginis pellucidis.

The filaments have a diameter equal to ·0008 of an inch. Marine.

L. PLANA, n. sp. Trichomatibus compressis, viridibus, distincte articulatis, articulis diametro 4plo brevioribus; vaginis pellucidis.

The filaments have a diameter equal to ·0006 of an inch. Marine.

SIROSIPHONACEÆ.

MASTIGOCLADUS BURSA, n. sp. Subglobosus, intus cavus, saturate viridis; cellulis ellipticis, superne attenuatis.

A remarkable plant, having the habit of a *Nostoc*, but in structure agreeing with the genus *Mastigocladus* instituted by Cohn.

Col. Pike's plant is from mountain-streams; small specimens are subglobose; the larger attain a diameter of several inches, and are more irregular.

NOSTOCHACEÆ.

NOSTOC PURPUREUM, n. sp. Purpureum, subglobosum, trichomatibus flexuosis; articulis plano-convexis; cellulis perdurantibus sparsis, globosis, ceteris paulo majoribus.

In mountain-streams, half an inch to an inch in diameter.

PALMELLACEÆ.

HORMOSPORA TRANSVERSALIS, *Bréb.*

I cannot find any essential difference between Col. Pike's specimens and the French plant.

The total number of species is 155; the orders having the greatest number are Dictyotaceæ, Rhodomelaceæ, Corallinaceæ, Gelidiaceæ, Helminthocladieæ, Cryptonemiaceæ, Siphonaceæ, and Confervaceæ; of the lower orders, so well represented in temperate climates, two, Nostochaceæ and Palmellaceæ, have each only one species.

Seventeen well-known European species occur, which, however, are for the most part cosmopolites, viz. *Padina pavonia*, *Laurencia obtusa*, *Lomentaria parvula*, *Melobesia verrucata* and *M. pustulata*, *Gelidium corneum*, *Plocamium coccineum*, *Spyridia filamentosa*, *Grateloupia filicina*, *Ceramium diaphanum*, *Codium tomentosum*, *C. adhærens*, *Enteromorpha compressa*, *Ulva latissima*, *Draparnaldia pulchella*, *Chætophora ærea*, and *Lyngbya majuscula*.

Twenty-three South-African species are in the list; twelve are found on the shores of Australia, fifteen on coasts of E. India, fourteen in the Red Sea; and twelve, so far as known, are peculiar to the island.

The general feature of the Mauritian Algæ is therefore of a mixed character; excluding cosmopolites and endemic (?) species, there is a large percentage of S. African, E. Indian, and Australian species.

On the Changes going on in the Vegetation of South Africa through the introduction of the Merino Sheep. By Dr. John Shaw, F.L.S.

[Read December 18, 1873.]

Not much has been written, as far as I am aware, on the direct influences of overstocking on the indigenous flora of some tracts of South Africa. I propose in this paper to show how the persistent and greedy system of overstocking farms has changed the flora, introduced and given undue influence to a worse herbage, and bids fair in time to change the climate and, with this, the whole character of the vegetation.

The Merino sheep have introduced, by the achenes clinging to their wool, one plant from Europe, the obnoxious *Xanthium spinosum*. This weed extended itself throughout the sheep-walks of the colony to such a degree, and so endangered the character of the wool through its achenes, that special legislative enactments have been made in regard to its extirpation; and rigid enforcement of penalties alone has kept it from being a sweeping curse to the wool-producers. In the Orange-River Republic, where only until the last year this weed was allowed to revel undisturbed, save where some stray Dutch boer was given less to coffee-drinking and sleep and more to an intelligent regard for the future of his pasturage, it had so affected the wool of some parts of the country as to make it nearly unremunerative as a staple product. Tardy legislation on the obnoxious introduction had to be adopted there also.

Legislation is not likely, however, to do much for the colony in regard to the evil of overstocking; and indeed it is not apparent that there can be any other course open for the colony but that

most effective one of an evil curing itself; and that generally falls on another generation.

Before entering upon the subject proper, it will be necessary to give an outline of the surface and physical features, and in connexion with them a few observations on the distribution of the plants of South Africa. The Cape flora is a poor one in regard to types: its orders and genera are not many; its subgenera are more abundant; but there is a marvellous differentiation into species, and these are most variable in character. The Heaths, Mesembryanthemums, Senecios, &c. are conspicuous illustrations. South Africa is an extensive tableland, bounded on the north by the low-lying Kalihari desert and the valley of the Limpopo. In the Cape Colony we have two concentric semicircular ranges:—1st. The coast range, which runs from the Olifant river southwards in the direction of the Cape of Good Hope, and thence eastwards and east by north until it is lost in the Kaffrarian mountains. Between this range and the coast there is a belt of land varying from 50 to 100 miles in breadth. 2nd. There is an inner range of a similar character, but higher; and between it and the coast-range there is a more elevated belt of land. The culminating ridge of the tableland, cutting the Colony as nearly as possible into two equal parts, runs from west to east (the great Sneeuwberg, as it is called, rising to the height of from 7000 to 8000 feet), and is continued north-eastward and then northwards by the Witbergen and the Drakenberg (which forms the western boundary of Natal) to the valley of the Limpopo.

This disposition of the mountain-ranges has obviously much to do with the climate of the Cape. The coast strip of land is soaked in moisture, and is luxuriant in woods and vegetation. The flora is therefore a rich one, and the landscape is adorned with woods of a magnificent character. It has the celebrated Zitzikamma and Knysna forests, as yet, on account of their impenetrable character, but little investigated by the botanist. The inner strip contains the inexplicably isolated region of heaths in the south-west, and is drier, but still, on account of the height of its mountains, well wooded and watered. But starting from the curve of the inner range in the south-west, and going in a direction to the culminating ridge, there is the dry tract, forming a peculiar sub-province of plants, known as the Karoo, and visited only by periodical but short-lived though heavy rains which run over a dry and hard-baked ferruginous soil to the watercourses, without

doing much to soak it or suit it for other than the scrubby deep-rooted shrublets and bulbs of the region. Beyond the great central Sneeuwberg range we have in a direction north-eastward what is known as the Midlands, a country which was once, and in the time of Burchell and other old botanical travellers, covered with luxuriant prairie-like grass. The plains had few trees, mainly the *Acacia horrida* and brushwood of various species; while the hilly ranges were covered with bushes and trees, and along the river-courses and smaller feeders various species of Acacias, Willows, &c. luxuriated. This is now the great wool-producing country, and the country which is being changed in the character of its vegetation by overstocking.

There is little of a satisfactory character delineated in regard to the subdivisions of the South-African flora; but, to conclude my introductory remarks, I may further particularize in connexion what I have said, that the western flora is distinct from the eastern in some of its types, and even in specific differentiation, almost to the total extent of the types they have in common. The *Ericæ*, with a few unimportant exceptions, which make the extraordinary development of them in the west even more conspicuous, are all but restricted to a narrow slip in the inner belt of land to which I have referred. The *Restiaceæ* are mainly in the west. On the other hand, the arborescent Aloes and succulent Euphorbias are eastern; *Bignoniaceæ* and *Rubiaceæ* are also mainly eastern. The western flora is a more peculiar and isolated one than the eastern.

The southern belts of land are, as would be expected, a common meeting-ground of west and east, but of a most distinctly western character. The Karoo is isolated and peculiar on account of its soil and climate, and forms a tract of country over which neither eastern nor western plants travel. The midland region beyond the Sneeuwberg and to the north-east, even considerably into the Free State, is another subdivision; and while it has *Aptosima*, *Peliostoma*, and the order of the *Pedalineæ*, and other forms of a subtropical character, its general affinities are to the Karoo flora. To the south and in the east we have what may be called the Kaffrarian subdivision, a flora which of necessity has many Natalian and even Abyssinian types, and is, although very distinct in many of its genera from the rest of South Africa, less pure, if I may be allowed the expression, than the peculiar western or Karoidean and older floras.

I have said that the midland province is the great sheep-country. They do not thrive towards the coast in the rich grassy pasturage there. In common parlance the herbage is said to be there sour, "zuurveld," as the Dutch call it, a term which is applied locally to a continuation of the second or inner range in the eastern province, the Zuurberg, on account of the character of the herbage. The pasturage, however, of the midlands is splendidly adapted for sheep; and consequently it is there we find sheep-farming carried on to an extent hurtful to the flora. When first introduced, they fed mainly on the grass; and in a country with its periodical or season-rains, and under a high sun, the family soon began to give way and succumb. Suffruticose plants and, in general, shrubs could alone stand against the sheep and such a climate; and at first, and as long as the grass was prominent, these would enjoy immunity from the sheep. But the grass vanished very rapidly, and the bush and scrub came to be the main resource of the flocks, and the ground was left to them and to obnoxious and poisonous herbs—some Asclepiads, poisonous *Tripteres*, and the intoxicating *Melicæ* (the "dronk" grass of the Dutch colonists).

The climate necessarily became affected. The rainfall came down less certainly and oftener, in the form of thunder-torrents. Side by side with the attacks of the flocks the more subtile and insidious agency of a changing climate came into power. The hardy plants of the Karoo commenced to travel northwards, and added their energies to the extirpating of the indigenous and proper flora of the region; species of *Chrysocoma*, *Pentzia*, and so forth, largely developed in the Karoo, came in; moreover, being of a bitter and nauseous character to the taste, they enjoyed immunity, and were only eaten in circumstances of dire necessity by sheep. Sweet bush, such as Lyciums, vanished before them; and the *veld* has become what is called by the farmers in the course of time, and indeed is now, a "bitter veld," and is rapidly becoming an extension of dreary, scrubby, half-desert Karoo.

Such is the general argument. It may be said, however, by those familiar with the conditions of South-African life-energies in former times that the very same tracts of country supported thousands, and even millions, of antelopes, that vast flights of locusts used to devour every thing green before them, and still the herbage remained always a grassy one. It must be understood, however, and explained that these animals in such vast numbers were always on the move (migratory), following the

rains and the young fresh herbage. The vegetation could not have supported them as persistent occupiers. But then the sheep are; and their course is not a leisurely one or restricted to a small area. On account of the increased poverty of the pasturage, their eating is carried on by and during a limited march all day; and hence they cause more destruction by treading down than even by eating; and hence, too, the country, with a naturally hard ferruginous soil (the production of the wasting dioritic rocks of the region), has even become harder. The rain is no longer allowed to the same extent to soak into the ground, is carried off into the water-courses to a greater degree than formerly, and fails to supply as it did in the past, the great stand-by of the country, deep perennial fountains. The fountains of the midlands in South Africa have been becoming notoriously weaker every year.

It may be of some interest to give the history of one or two of these plants to which I have generally referred.

The Asclepiad genus *Gomphocarpus*, and especially the species *G. lanceolatus*, is a plant indigenous to the midland region. It is a plant never eaten by the sheep. It has come in consequence to cover extensive tracks of the country. The plant is the only tall bush to be seen in whole flats. There is, in connexion with this fact, a very interesting note to be made. We have one species of locust of a most gaudy banded red and green colour. It does not go in flights, like the destructive species; it is a solitary insect. Nor is it victimized by birds and other enemies; its odour is an effectual protection to it. Trees and large bushes are its nuptial bowers; and with the decrease of these in the region, I am informed by the old observing colonists, it decreased. But through the extension and diffusion of the tall *Gomphocarpus* it has secured conspicuous places to be observed once more, and is rapidly on the increase, and now seems to be the only organism to which the acrid- and viscid-juiced *Gomphocarpus* is of use. It lazily feeds on it, and ultimately buries itself at its roots with the eggs of a future brood.

The *Chrysocoma truncifolia* is the prevailing plant of the veld of late years, and seems to be remarkably suited to the changed climate. It belongs originally to the south-west of the colony. At first it was eschewed by the sheep; but now they have had to fall back upon it from necessity. It is a hardy plant, and presents a green appearance when every thing else is blackened and scorched. In the southern parts of the midlands it now is so

solely the resource of the sheep, that the mutton, from the beginning of the year to the end, tastes and smells of it. But it would appear there is to be no rest from change, and no fixedness in the flora of the region, because another invader is beginning to spring up, and the reconnoitrers have already got so so far as close upon the Orange River. I refer to the *Elytropappus rhinocerotis*, the Rhemster bush of the colonists, a thoroughly worthless and uneatable shrub, which the sheep seem chary of touching. The time will inevitably come when it will take possession; and I am convinced that before very long it will be a conspicuous plant some hundreds of miles north of its original home in the south-west of the colony.

It would, however, be easy to multiply examples. What is to be done to stem the downward and ruinous course referred to is not very clear. South Africa is, as it has been, an unfortunate country. We have, I am sorry to say, no attempts at acclimatization of any importance. It is for the Government to experiment on the introduction of grasses, and, if possible, attempt to save the richest region (because the great wool-producing region) which the Cape Colony has from becoming a wilderness. Much could be done in this direction and by the construction of colossal dams, to save the country, keep up the deep springs, and, in connexion with them, rear the beginning of forest-lands to modify and increase the rainfall. This Karoo veld is extending even into the Vaal region, and is a common bush in the lately occupied parts of the diamond-fields, the Crown colony of Griqualand West. It is, wherever, it goes, the sure index of a changing climate; and persistent moisture weakens it. Much, therefore, in the direction I have indicated could be done, viz. by the construction of large dams (for which the country is remarkably suited), and the commencement of forest-planting to encourage the rainfall and so to weaken the plant as well as directly attack it by an increase of vegetation promoted by increased moisture.

This paper is mainly intended to draw attention to an evil under which we labour in the inland district of the Cape Colony; but one of my purposes in bringing the matter before the Linnean Society is, if possible, to elicit information as to the course the Cape Colony should adopt to keep one of its richest tracts from becoming a desert, or a region of obnoxious and poisonous plants. It is certainly a subject of alarm to the country when it is known that a drier season than usual entails poverty and death to an incalcu-

lable extent amongst our flocks in South Africa. Some tracts of country are poisoned by the extraordinary increase of the *Tripteris flexuosa*; and transport riders, with their oxen (our only carrying-power), have to travel through certain parts of the country without pausing, on account of the *Melicæ*, grasses which have increased to an extent scarcely to be fancied in the last few years, and on eating which cattle become afflicted with intoxication to an alarming extent.

On a new African Genus of Podostemaceæ.

By H. A. Weddell, M.D., F.M.L.S.

(Plate XIII.)

[Read February 20, 1873.]

The species of this order hitherto observed in Africa amount in number to sixteen, nine of them forming the well-known genus *Hydrostachys* and suborder Hydrostachyeæ. Podostemaceæ proper, or Podostemoneæ, have till now had only seven representatives in that part of the world, distributed among four genera, namely:—*Tristicha*, so common in tropical America, three species; *Dicræa*, an Indian genus, two Madagascar species; *Sphærothylax*, from South Africa, one species; and *Anastrophea*, a very singular and equally monotypical genus, from Abyssinia*.

It may thus be seen that there have been up to this day only three genera mentioned as peculiar to Africa; these are *Hydrostachys*, *Sphærothylax*, and *Anastrophea*. The one now to be described under the name of *Angolæa* (an allusion to its birthplace) may consequently be considered a very interesting contribution to the African flora, and the more so as it belongs to a small group which appeared to be not yet represented there. This group comprises the American genera *Neolacis* and *Lophogyne*, and is charac-

* This genus, a complete description of which will appear in the volume of the 'Prodromus,' now in course of publication, was detected by Schimper in the mountains of the neighbourhood of Gaffat, at an elevation of near 8000 feet. One of its most peculiar characteristics consists in its having flowering stems of two such very different forms that only direct evidence could have convinced me that they originated from one and the same rhizoma. The spathellæ of the elongated stems generally burst at the apex, whereas in the thalliform stems they constantly open longitudinally, thus affording a remarkably strong proof of the insufficiency of the character on which Tulasne founded his genus *Hydrobryum*, which must not be confounded with Endlicher's.

terized, among oligostemonous Podostemoneæ, by an æquivalved capsule and free stamens, the two genera just named being readily distinguished one from the other by the form of the stigmas, linear in the first, dilated and membranaceous in the second. *Angolæa* differs from both not only by its capitate stigma, but by its unilocular capsule, the last character being rather an exceptional one among American genera, but, singular to say, common to all genuine African ones. It may be added that the pollen grains are didymous in the new African type, as in *Podostemon* and most other monadelphous genera, whereas they are spherical or trigonous in *Neolacis* and *Lophogyne*, and that the spathella is pedunculate *.

Before giving the more complete diagnosis of the proposed genus, I have only further to remark that in a paper read before the Botanical Society of France some time since, but only just issued, I alluded to the peculiarly confined areas of many Podostemaceæ that it had been my lot to fall in with in the course of my travels through South America, and concluded my observations by saying that in all probability there was still an abundant harvest of Podostemaceæ to be made in the many affluents of the Amazon north of the Araguay and Tocantins, all of them offering favourable abodes to these plants on account of the numerous strong ridges that intersect their beds. Now, seeing that the flora of continental Africa, which a few years since had but two species of Podostemads to boast of, has now at least three times that number, is it not to be expected that other novelties of the same kind will turn up when the under-water vegetation of many inland rivers shall have been more thoroughly investigated?

Angolæa, gen. nov.

Flores hermaphroditi, nudi, in cymulas irregulares laxas foliosas ramulos terminantes dispositi, rarius solitarii, singuli prima ætate spathella clausa inclusi, dein hacce apice disrupta subexserti. *Stamina* 3–4 unilateralia; filamentis omnino liberis aut interdum 2 breviter monadelphis; antheris oblongo-ellipticis basi emarginatis, loculis contiguis introrsis; granulis pollinis didymis. *Staminodia* 2, ex utroque latere androcei enata eoque nonnihil inferiora. *Ovarium* fusiformi-oblongum, a lateribus

* This is very characteristic. In fact I know of no other case of the kind among Podostemads. Nowhere does the spathella offer so much resemblance to a perigonium, or at least to an involucrum, as it does here.

compressum, uniloculare, placenta centrali fusiformi, ovulis anatropis sessilibus sat crebris. *Stylus* brevissimus. *Stigma* capitatum, ante anthesim a lateribus compressum et apici ovarii oblique insidens, dein hemisphæricum, supra papillis crassis brevibus vestitum. *Capsula* ellipsoideo-oblonga, stipitata, 8-costulata, unilocularis, in valvas duas æquales pedicello persistentes ab apice ad basim dehiscens, placenta et seminibus simul ejectis.—Plantula Africæ occidentalis, facie *Podostemonis*, rupibus immersis rivulorum affixa; caule tenui elongato dichotome ramoso; foliis alternis dichotome laciniatis, laciniis omnibus filiformibus; cymulis vix multifloris, spathella pedunculata, flore ipso in fundo hujusce subsessili.

A. FLUITANS †. Hab. in undis rapidioribus s. vehementius impulsis amnis Quanza, loco dicto Cambambe, in Angola (*Monteiro*).

Caules s. rami primarii fluitantes, 3–4-pollicares v. longiores, læte virides, merithallis inferioribus elongatis, superioribus gradatim brevioribus. Folia 1- sesquipollicaria, 4–5plici vice dichotome laciniata, laciniis ultimis 3–4 lin. longis. Flores modo solitarii et juxta dichotomiæ sinus orti, modo et frequentius 2–5 in cymulas umbelluliformes ramulos terminantes congregati; bracteis (quam flores paucioribus) foliis conformibus aut brevioribus laciniisque applanatis. Spathella virginea ellipsoidea v. obovoidea, obtusissima, lineam circiter longa, inferne breviter attenuata pedunculoque filiformi 1–4 lin. longo nudoque suffulta, demum floris incremento apice in dentes s. lobos 3–5 inæquales rupta, figura tunc fere campanulata. Stamina 3, rariusve 4, filamentis omnino evolutis 2–3 lin. longis liberis, aut nonnunquam 2 basi magis minusve connatis; antheris sesquilineam et quod excedit longis, lobis subæqualibus; polline pallide luteo. Staminodia linearia v. lineari-lanceolata, semilineam circiter longa, integra v. rarius lacinia laterali aucta. Ovarium antheris brevius; stigmate ob compressionem harumce (in flore nondum evoluto) initio plus minus obliquo lateribusque impressis, sed mox erecto et rite hemisphærico. Capsula linea vix longior, semilineam lata, eleganter 8-costulata costulis æquidistantibus juxta stipitem $\frac{1}{4}$–$\frac{1}{3}$ lin. longum desinentibus; stigmate demum delapso v. haud raro in apice alterius valvæ persistente, valvis cæterum rectiusculis v. parum incurvis; placenta ante dehiscentiam basi et apici loculi affixa, fere regulariter fusiformi, cicatricibus seminum delapsorum notata. (*V. s. ex hb. Kew.*)

DESCRIPTION OF PLATE XIII.

Fig. 1. Planta, magnitudine naturali.
2. Spathella nondum aperta florem includens.
3. Flos junior triandrus, spathella resecta.
4. Stamen a facie antica visum. 5. Granula pollinis tria.

Fig. 6. Ovarium junius a latere visum.
6 *a*. Idem a facie postica visum.
7. Flos triandrus evolutus, antheris vacuis.
8. Flos tetrandrus. Capsula immatura filamentis marcidis stipata.
9. Stamina e flore triandro juniore extracta, filam. 2 monadelphis.
10. Staminodia. 11. Capsula matura.
12. Sectio transversalis pericarpii et placentæ seminibus nudatæ.
13. Placenta semina 2 adhuc gerens. 14. Semen.
15. Embryo. 16. Capsula aperta, vacua.

Revision of the Genera and Species of Tulipeæ. By J. G. BAKER.

[Read Dec. 4, 1873.]

IN this third paper on Liliaceæ I propose to monograph the caulescent capsular genera with free perianth-segments. Between the great mass of capsular polyphyllous Liliaceæ, a group which includes not less than between seven and eight hundred species, or two-thirds of the whole order if Asparagaceæ, Colchicaceæ and Smilaceæ be excluded, there is very great uniformity in flower- and fruit-structure. The group now under consideration has never an introrse dehiscence of the anther, and in this respect recedes from typical Liliaceæ, as I intend to explain more fully further on; but leaving this out of view for the present, I may fairly say, by way of defining the tribe, that these capsular Liliaceæ with free perianth-segments fall readily, by character of rootstock and by general habit, into three great groups:—first, the scapose bulbs, as represented by *Scilla*, *Ornithogalum* and *Allium*; second, the Asphodels and Anthericeæ, with rootstocks fibrous only, not crowned with bulbs; and, third, the Tulipeæ, with bulbs and leafy stems. The only genus that is doubtful in position between the caulescent and acaulescent bulbous groups is *Gagea*, in which about half the species are, like *lutea*, strictly scapose and umbellate, with close leafy bracts from the base of the umbel, and the other half corymbose, with the bracts more or less remote from one another and the lowest arising from the stem distinctly below the branches of the inflorescence. It has a short basifixed anther, with lateral dehiscence, exactly like *Lloydia*; and although I have not included it now, on the ground that, if caulescent stems be made the chief character of the tribe, it is best excluded, yet I do this with the saving clause that, if anther-structure be made the chief test, it must be included in Tulipeæ, as was long ago

proposed by Bernhardi. These caulescent genera are the most showy of all the Liliaceæ; and as they include a large number of old garden-favourites, and are, as wild plants, restricted to north temperate regions, they might perhaps be expected to be well-known botanically. But the actual fact is quite the contrary. There are very few groups of flowering plants which have been so little investigated from a general point of view. *Lilium*, *Fritillaria*, *Tulipa*, *Calochortus*, and *Erythronium* are all genera in which the types are often so close to one another that it is necessary to examine them very carefully to separate species from one another, and in which a different plan of discriminating species makes a great difference in the number adopted. The latest general synopsis of the tribe is that contained in the fourth volume of Kunth's 'Enumeratio.' This is now thirty years old, and, even at the time of its publication, was badly adapted for determining unknown specimens, inasmuch as, though it is very full and complete as regards generic descriptions and as an index to the descriptions and figures of previous writers, yet in the book itself the species are usually characterized by brief diagnoses which are quoted from other authors without any effort being made to make them harmonize. A general monograph much better adapted for the determination of unknown specimens is that of the younger Schultes, contained in the sixth volume of the 'Systema Vegetabilium' of Roemer and Schultes, published in 1829, fourteen years earlier than Kunth. So that for the latest general handbook of the tribe we have now to go back for a full generation; and I need scarcely say that during the last thirty or forty years a great many new species have been discovered, principally in the Orient, Southern Siberia and California, and that a large amount of additional information about the characters and range of variation and geographical distribution of the old ones has been obtained, and that a great number of figures and detached descriptions have been published in local floras and the horticultural periodicals. At the present time we may fairly say that a general synopsis of this tribe, available for every-day working use, is one of the most pressing needs in species-botany. After going through a good supply of material both in the shape of living and dried specimens, I have found, as might be expected, very few new species to add, and a very large number of specific names in garden use either to cite as synonyms or place as varieties.

In these petaloid monocotyledons we may safely lay it down as a general rule that all descriptions not drawn up from living specimens are more or less unsatisfactory, so that a synopsis must of necessity be far more imperfect than in those orders in which herbarium specimens show the distinctive characters more clearly; and a good synopsis must be of gradual growth and the work of observers in different countries uniting together the result of their studies. As regards genera, it seems to me that we can arrange the plants of the tribe most naturally and grasp them the most readily by adhering substantially to the genera which Linnæus laid down, adding only to his *Lilium*, *Fritillaria*, *Erythronium*, and *Tulipa*, *Calochortus* (with which he was unacquainted) and *Lloydia* (which he placed under *Anthericum*). If we do this we get four genera, *Lilium*, *Fritillaria*, *Tulipa*, and *Calochortus*, each clearly marked and popularly acknowledged, each containing from twenty to fifty species, and each with such a range of structure within its bounds that it might upon a narrower view of generic limitation be subdivided. The great want in the tribe now is, that the best and most natural subdivisions of genera should be established and defined, and the species properly classified under them. To this point little attention has as yet been directed; and as what I have to advance upon this head will be best seen from the detailed synopsis, it is needless to discuss the question in these preliminary general remarks.

Going through the organs seriatim, the following points are noteworthy:—

Underground development.—All the plants of the tribe are able in a state of nature or under cultivation to hold their ground, and increase more or less, by means of bulb-reproduction, independent of being multiplied by means of seed. In the structure of the bulbs of the tribe we may define four leading types:—

1. The squamose perennial bulb, as exemplified in all the Old-world species of *Lilium*. This consists, in its mature form, of a large number of thin flat lanceolate or oblong-lanceolate scales tightly pressed against one another face to back, and spirally arranged round a central axis which is not produced either vertically or horizontally. From the underside of the central axis proceeds downwards a dense tuft of fleshy fibres, and from the upperside is produced the flower-stem of the year, its lower part, between the summit of the bulb and the surface of the soil, giving off copious radicular fibres, which assist greatly in procuring the nourish-

ment and strengthening the hold upon the ground of the developed flower-bearing stem. This underground root-bearing portion of the stem above the bulb is often vertical, but in some species, as for instance *Lilium Leichtlinii*, will creep for a length of half a foot, so that, if grown in a pot and the bulb planted in its centre, the stem will spring up from the side of the pot. All these numerous flattened scales of the bulb possess potentially the power of developing new bulbs in their axils, and will do this, in some species at any rate, under cultivation, if a bulb be broken up and properly treated; so that what with bulb-reproduction and what with seed-reproduction, a skilful operator may in three or four years multiply fifty-fold his stock of a desirable species or variety. But in a state of nature there is only one new flower-bearing stem developed each season from the centre of the bulb, and a few from the axils of the decaying outer scales. A new bulb, whether grown from seed, or from bulblets developed in the axils of the above-ground leaves of the floriferous stem, or produced in the axil of one of the bulb-scales, takes not less than three years under the most favourable circumstances before it develops a flower-bearing stem. The first season we get an ovoid mass, perhaps a quarter of an inch in thickness, composed of half a dozen tightly imbricated scales, which sends out three or four slender radicular fibres from its base. At the end of next summer we have a bulb as large as a hazel nut, with a copious development of strong radicular fibres from its underside, and the half dozen scales prolonged above the soil into a rosette of oblanceolate leaves. Next year, if circumstances be favourable, the flower-bearing stem is developed; and then, if nothing untoward happens, the bulb goes on living for an indefinite period, sending out each year a flower-stem from its centre, and shredding off old scales with buds in their axils, more copiously in some kinds, less copiously in others, from the circumference all round. In two of the Californian lilies (*Washingtonianum* and *Humboldtii*) this type of structure is modified by the central axis of the bulb being prolonged horizontally, so that the scales are thrown out of a regular spiral, and the mature bulb is irregular in shape and more or less flattened laterally. Here, then, we get a squamose bulb taking the first step to pass off in the direction of a true rhizome; but the fleshy scales are quite similar to those of the typical form. The direction of the rhizome is vertically oblique, the new scales being formed at the deepest end. A second

modification of this type of structure I cannot do better than describe in the words of Duchartre (' Observations sur le genre Lis,' p. 28):—

"To give an idea of this development, allow me to report what I have seen in *Lilium canadense*, as examined at the commencement of the month of March, and in consequence at a time when only the first indications of the vegetation of the year were observable. At the base of the stem which had flowered the preceding year, and of which there remained only a small portion hidden in the ground, was found the bulb from which that stem had issued forth, a bulb formed of short scales, still fleshy and fresh for the most part, pointed and laxly imbricated, which, taken as a whole, was about twice as broad as deep. Immediately above this bulb was the remainder of the old stem, bearing a ring of root-fibres now dead and dried up. Finally the extreme base of this same old stem was prolonged below the bulb with a diameter nearly double that which it had above it; and after half an inch or more it ended by a broad truncation. It is from this old stem which has flowered in the preceding year, immediately below the old bulb, and very likely from the axil of a scale that has fallen, that the horizontal branch is originated, which at its extremity bears the new bulb from which the conical summit of the shoot which will soon develop into the flower-stem of the year is already seen to arise. This rhizome does not reach a length of more than an inch or an inch and a half. From its points of origin it descends a little into the soil, then raises itself to become horizontal, and finally rises at its extremity to form the axis of the new bulb and to be finally continued as the new flower-stem. In its underground progress it bears small spiral scales, thick and fleshy, of which the first are slightly spaced, but those at the end of this subterranean branch growing closer and larger and forming thus the new bulb. From the anterior portion of this rhizome, especially from the part that bears the lower part of the young bulb, arise numerous thickish rootlets, on the healthy action of which the vitality of the new vegetation evidently depends. Later on in the year the old bulb disappears, the horizontal rhizome thus becoming free. Then the rhizome dies in the part which does not produce rootlets; and at the same time a new rhizome arises from the base of the bulb of the year, to form in its turn at its extremity another bulb to yield the flower-stem of the year following. There are produced, then, in these Lilies a succession

of subterranean bulb-bearing branches, or a series of successive generations, each of which has an annual bulb for its fundamental basis."

In parting finally from this squamose type of structure*, I wish to point out that there are three different kinds of "rhizome" in different species, developed in connexion with it, all of which are spoken of in books under the general term "rhizome," but which are not homologous, namely:—1st, the produced oblique central axis of the Californian Lilies; 2nd, the lower part of the horizontal branch originating from a bud developed in the axis of a leaf-scale, which branch at its extremity bears a new bulb, as in *Lilium canadense*; 3rd, the lowest part of the flower-bearing stem above the bulb when it creeps below the surface of the soil, as in *L. Leichtlinii.*

2. In most of the *Fritillariæ* we get a well-marked type of structure, for which I am not aware that any distinctive name has been proposed. Take the bulb of *Fritillaria Meleagris* at the flowering-season, and we find as follows:—in the centre the flower-producing stem, bearing from its base, but not above the bulb as in *Lilium*, a tuft of slender radicular fibres. Tightly pressed against the base of the flower-stem are a couple of hemispherical scales, not thin and flat as in *Lilium*, but half as thick as broad (say half an inch broad and a quarter of an inch thick), rounded on the outside, flat on the inside, where they are pressed against one another and the base of the flower-stem. These are the bases of single leaves, homogeneous, not at all laminated in structure. From the summit of each, before the development of the flower-stem, arises an oblanceolate leaf which dies down before the flower is produced. In the autumn these two scales produce in their axils buds in the same way as in *Lilium*, one of which produces the flower-stem of the following year; and on the outside they are wrapped in two or three thin membranous tunics, which have never produced leaves or fulfilled any nutritive function. This type of structure is scarcely varied through about half the genus *Fritillaria*; and it is this type that is distinguished in the synopsis of the genus as a tunicated bulb. But in the American Fritillaries there are no outside tunics, and the scales are numerous, not large and flattened as *Lilium*, but small granules as thick as wide. Upon this difference Dr. Kellogg has

* See also Royer in 'Bulletin Soc. Bot. France,' tome xix. p. 157, and Duchartre's remarks in the same volume, p. 159.

proposed to separate the American Fritillaries as a genus under the name of *Liliorhiza*; but there is no difference in flower-structure between the Old-World and the New-World species, whilst the bulb of the New-World *pudica* is sometimes barely distinguishable from those of the *Meleagris* group; and we get the *Liliorhiza* type represented in Asia in *F. kamchatcensis*; and in the Old-World *F. imperialis* and *persica*, which were classed as Lilies by the pre-Linnean authors, we get a large perennial squamose bulb without any tunic, not materially different in any way from that of *Lilium*, with the scales as thin, but not so regularly formed, and broader at the base. So that it will be seen that *Fritillaria*, which has been little studied from this point of view presents great variety and much interest in its bulb-structure, and runs over the line of transition which separates the squamose from the tunicated type. In Gen. Fl. Germ. there is a figure, for *F. pyrenaica*, of an accessory bulb at the end of a horizontal elongated stolon, as is frequent in the tulips.

3. The third type of structure, an annual laminated tunicated bulb, runs, with much modification as regards the number and thickness of the laminæ and the texture and persistence of the tunics, through *Tulipa*, *Calochortus*, and *Lloydia*. In all these, radicular fibres are developed from the stem on the underside of the bulb only, and at the end of the flowering-season the old stem may be traced down to its base quite slender and cylindrical, with all the nutriment absorbed from the leaf-bases that have nourished it; and outside of it, within the same external tunic, stands the bulb well developed, which is to bear the flower-stem of the following year. In *Tulipa* the outer tunics are brown and leathery, the inner tunics several in number and so thick that the bulb is broad-ovoid in shape; and by the side of the old stick-like stem and well-developed bulb that is to flower next year, may be traced the nascent bulb of the year following, so that the bulbs are in their third year when they reach the flowering-stage. The subordinate bulbs thrown out from the base of the old ones are often lengthened out upon rhizomes; and it is this that is meant in the synopsis when the bulbs are said to be stoloniferous; and it is upon the difference whether these accessory bulbs are sessile or stalked that the distinction between Reboul and Parlatore's "Tulipæ gregariæ" and "Tulipæ erraticæ" depends. In *Calochortus* the structure is similar to that of *Tulipa*; but the inner tunics are fewer, and the outer thinner. In the Mexican species

of *Calochotrus* the outer dry coats form a dense mass of reticulated fibres mixed with little cellular tissue, like those of *Crocus vernus* and *reticulatus*. In *Lloydia serotina* the outer coats are thin, grey, and membranous, and the inner coats so little thickened that the bulbous dilatation at the base of the stem is very slight; and we thus get an oblique rhizome-like bulb similar to those of *Allium* and *Rhiziridium*. But the essential structure, which has been fully illustrated by Wydler *, Irmisch †, and Michalet ‡, is identical with that of *Tulipa*; and it is said that, owing to the thinness and dryness of the tunics, and the high alpine stations in which the plant grows, by careful dissection its history may be traced out for eight or ten years. Here it has been clearly shown that the accessory basal bulbs are sometimes sessile and sometimes stalked, in one and the same species, according to circumstances.

4. In the section *Gageopsis* of *Lloydia* we have a fourth modification of structure, a tunicated corm. Here, as in *Gagea*, the floriferous stem is nursed and nourished by the modified base of a single leaf, which leaf is fresh and green at the time that the floriferous stem is developed, springing of course from the tip of the corm, whilst the stem arises close to it from a little on one side of the corm. In some species of *Gagea* the nascent corm of the year following may be seen protruded from the side of the old corm at the flowering-time, already bearing a well-developed leaf. This is in the two-leaved species, like *G. arvensis*. In some other species it may be seen at the flowering-time, but does not grow out into a leaf; and in some others, as in our English *G. lutea*, it is invisible at the flowering-time; and these have always a solitary leaf. In *Erythronium* also the flower-stem is nursed by the much thickened base of a single leaf. In a newly discovered American species a very remarkable kind of rhizome has lately been figured and described by Dr. Asa Gray §. The corms are nearly half a foot deep; and a lateral offset springs from the base of the stem near the surface of the soil about midway between the corm and apparent bases of the solitary opposite pair of leaves. This offset works downwards, sometimes remaining

* 'Regensburg Flora,' 1859, pp. 33–36.

† Mohl and Schlecht. 'Bot. Zeit.' 1863, pp. 161–4 and 169–173, tab. 6, with 29 analytical figures.

‡ 'Bulletin Soc. Bot. France,' vii. p. 676.

§ 'American Naturalist,' July 1871.

short, sometimes lengthening out; and its apex dilates into a new corm.

To sum up the bulb-structure of the tribe, the two main points of interest are:—

1st. That throughout the tribe the bulbs are strictly determinate and monocarpic, the main axis elongating into a flower-bearing stem, and the bulb, the cycle of existence of which is from one to three years, either dying or remaining, but in either case developing a new bulb in the axil of one of its scales. In what is called in the synopsis a perennial squamose bulb the old scales remain and a new bulb is developed into a flower-stem in their centre; in the third and fourth types the old scale or scales die, and the new floriferous stem is developed outside them.

2nd. We get in the tribe, side by side with a general uniformity in flower-structure, every range of transition from a typical squamose bulb, through a typical tunicated bulb, to a tunicated corm, the differences between them depending upon the breadth and thickness of the enlarged bases of the leaves, their duration, their uniformity or difference in texture, and whether they all or some only grow out to produce leaves above ground, and whether some only or all are dilated below the surface into reservoirs of nutriment.

Bulbillæ.—Bulblets quite similar in structure to those produced in the axils of the underground leaves are regularly present in the axils of some of the leaves of the stem in *Lilium bulbiferum* and *tigrinum*, in *Fritillaria macrophylla*, and in the Mexican species of *Calochortus*, and are occasionally developed in some of the other Lilies if the inflorescence be injured.

Leaves.—The leaves are mostly linear, sessile, with close parallel ribs of the most characteristic Endogenous type. In *Calochortus* they are always very narrow and more grass-like in texture than in the other genera except *Lloydia*. In *Tulipa* they are quite characteristic, lorate or lanceolate, with a very fleshy texture and a glaucous tinge. *Erythronium* has always a single pair of broad amplexicaul leaves opposite to one another, placed near the base of the above-ground part of the stem. Throughout *Fritillaria* the leaves are always sessile and narrow; in a few species they have peculiar cirrose tips. In *Lilium* there is more variety, the oblanceolate *Martagon* type, sessile, thin in texture, with lax subreticulated veining, being shown in several species. In *L. speciosum* and *auratum* there are short petioles that clasp the

stem. But by far the most remarkable deviation in the tribe is in the section *Cardiocrinum*, which has long clasping petioles, and very large broad leaves with a deep cordate base and reticulated nervation. In both *Lilium* and *Fritillaria* there is great variety in the way of opposition or alternation of the leaves. In a few *Fritillarias* and many *Liliums* the leaves are normally in regular whorls; but in *Lilium* the whorls are often, some or all of them, broken up; so that even as a specific character this verticillation needs to be used with caution.

Inflorescence.—The flowers are either solitary, or few or many arranged in centripetal racemes, which have a tendency under cultivation or injury to be congested into umbels. The Crown Imperial only is typically umbellate, with a corona of many bracts. The bracts are always simply reduced leaves, green, and little changed in character, and never in this tribe become membranous or spathe-like.

Perianth-form and colouring.—*Calochortus* recedes conspicuously from typical Liliaceæ by having the three outer segments of the perianth sepaloid in texture and lengthened out into points, whilst the three inner divisions are petaloid, generally deltoid, as broad as deep, and rounded on the outer border. The only other *Liliaceous* genus which thus takes on the *Bromeliaceous* character is *Xanthorrhœa*, which is very different in every other respect. By the character of a marcescent, as opposed to a deciduous perianth, we get *Lloydia* and *Erythronium* on one side, the other four genera on the other. Excluding *Calochortus*, the difference in shape between the outer and inner segments is generally but slight; it is most conspicuous in some of the Tulips, in which the inner segments are blunt and the outer acute. The general shape of the perianth marks off *Erythronium* clearly and *Lilium* less clearly from the rest, and in *Lilium* furnishes one of the best characters for the subordinate groups. The great genera are usually distinguishable at a glance by the colouring of the flowers—the blue-black basal blotches of the Tulips, the tessellation of the Fritillaries, and the minute brownish dots passing into papillæ of the Lilies being in each case quite characteristic, but by no means extending to every species of the genus.

Nectary.—All the other genera except *Tulipa* and *Erythronium* show some kind of a greenish glandular pit or carinal groove; but only in *Calochortus* does it extend quite through the genus. In all of them the absence or presence of this nectary, its variation

in form, and the vestiture of its surface and edges furnish good characters to mark groups and species. Unfortunately it is one of the characters of the flower that suffers most in the process of drying. Except in the case of a single Fritillary, the presence of prominent ridges and papillæ on the lower part of the face of the perianth-segments, is peculiar to *Lilium*; and there its presence or absence helps to mark the sections.

Stamens.—There is no conspicuous irregularity in the stamens throughout the tribe, the six anthers being always perfect and the filaments nearly equal in length and on a level as regards insertion. The filaments are either strictly hypogynous or adhere but faintly to the base of the perianth-segments. They are always uniform in shape, and never flattened out into petaloid processes. The anther is never properly introrse, but slits down the edges. In *Tulipa*, *Calochortus*, *Erythronium*, and *Lloydia* the anthers are strictly basifixed, being deeply excavated at the base to receive the narrowed point of the filament. In the three first-named genera they are long and narrow; in *Lloydia* very small and so short as to be nearly globular, just as in *Gagea*. In *Lilium* the long lightly poised anther is attached by its centre to the filament on the side nearest the middle of the flower, just as in *Colchicum*; *Fritillaria* comes midway between *Tulipa* and *Lilium*, the anthers in the *Meleagris* group appearing in an early stage as if basifixed, as, indeed, they were described by Bernhardi, but being seen later on to be slightly versatile, with the filament fastened a little above the base of the connective on the side nearest the middle of the flower. And in the small Indian section *Notholirion* the versatility is as clearly marked as in *Lilium*.

Style and Stigma.—In *Calochortus* the style is invariably absent. I have ventured to unite *Orithyia* to *Tulipa*, with which it completely agrees except in the presence of a short style. In *Lilium*, as here defined, the thick rather clavate style with a large three-lobed stigmatic knob at the end is quite characteristic and uniform. In *Fritillaria* we get every transition between an entire and deeply three-cleft style combined with great uniformity in other points; and just the same thing holds good for the small genus *Erythronium*. But in both these the dehiscence of the capsule is loculicidal, and the style never cleft down to the base.

Capsule and seeds.—Both in the septicidal dehiscence of its capsule and the character of its seeds *Calochortus* recedes conspicuously from all the other genera, containing within its bounds

a wide difference in capsule-shape. The other three large genera, *Tulipa*, *Lilium*, and *Fritillaria* resemble one another closely both in capsule and seed. They all have tightly packed discoid narrowly bordered seeds with brown testas, and large obovoid capsules with a distinct neck and loculicidal dehiscence, the splitting valves being connected with a network of slender fibres, which Salisbury called vibrissæ, which are characteristic of these three genera. *Erythronium* and *Lloydia* have small loculicidal capsules without vibrissæ, the seeds of both being few in number and characteristic in shape—in the first turgid with a peculiar caudicle, and in the latter narrow and three-angled.

Sources consulted.—Besides the various London collections, as explained in my former paper, I have gone through, for this tribe, the herbarium of Lindley at Cambridge, and have been lately favoured with the loan of that of M. DeCandolle, which contains a suite of authenticated examples of Reboul's Tulips, and several other things which we do not possess in this country. For living plants I relied, in the first instance, upon the gardens of Kew and Mr. Wilson Saunders. Beside these I have been greatly indebted to Mr. Barr, of Tooting, whose extensive collection of bulbs, a large stock of each species and variety, I have gone through at different seasons, and who has been most kind in giving and sending me flowers and bulbs for leisurely examination at home. For Lilies I am under great obligation to Max. Leichtlin, Esq., of Carlsruhe, who, as is well known, has made a speciality of the genus for many years, and been the principal agent in bringing back these beautiful plants to their present height of popularity. He brought over for the use of this paper his extensive collection of oil-paintings of his favourites, and has given me a series of detailed notes upon the bulb- and capsule-characters of the cultivated species; and in respect of species-limitation I have, to a very large extent, been guided by his opinions and suggestions.

On the relation of Liliaceæ to Colchicaceæ.—In noticing a former paper of mine *, Dr. Gray took me to task for incidentally exaggerating the strength or straightness of the line of demarcation between Liliaceæ and Colchicaceæ; and I recur now to the matter to say that it is impossible to go through the Tulipeæ without feeling how difficult it is to draw the line between them.

* 'Silliman's Journal,' 2nd series, vol. 50, p. 127.

Taking the best characters of distinction between the typical genera of the two supposed orders, we may fairly state them as follows:—

	Liliaceæ.	*Colchicaceæ.*
1.	Anthers introrse.	Anthers extrorse.
2.	Styles united.	Styles separated.
3.	Capsules loculicidal.	Capsules septicidal.

If we take the genera of Tulipeæ, we find for the first point that none of them has properly introrse anthers, and that in *Lilium* itself the structure is identical with that of *Colchicum*, and that in *Fritillaria* also the slit is down the side, and the attachment of the filament is on the side of the anther nearest the middle of the flower. Take the second point, and both *Fritillaria* and *Erythronium* recede from the Liliaceous type, whilst *Calochortus* does not show any one of three Liliaceous characters. Between Uvularieæ on the one hand and Tulipeæ and Asparageæ on the other, the line is very difficult to draw. *Uvularia* itself has basifixed anthers slitting down the edge, a loculicidal capsule, a deeply three-cleft style and a creeping rootstock. *Gloriosa* has a similar capsule and style, with versatile anthers attached on the inner side, and a large deeply lobed corm. These latter genera, with one or two others, will best form a group parallel with Tulipeæ in the non-bulbous series. For the exceptional genera classed with Colchicaceæ I refer those interested to Dr. Gray's note; and I am now quite satisfied that there are so many exceptions to the separating characters on both sides, that it is best to join them in one and the same Order.

Geographical distribution.—In the synopsis, counting several acknowledged garden hybrids, 179 species are admitted. Arranging the six genera according to size, they are as follows:—

Fritillaria	55	species.
Tulipa	48	„
Lilium	46	„
Calochortus	21	„
Erythronium	5	„
Lloydia	4	„

Taking the tribe as a whole, it is spread throughout the North Temperate zone, agreeing in this respect with Allieæ, but contrasting with most of the other tribes of Liliaceæ, several of which

are half, and one (Aloineæ) almost entirely Cape. Only one species, *Lloydia serotina*, is really boreal or Alpine. The south limits of the tribe are Mexico, the Philippines, South China, the Neilgherries, and the southern border of the Mediterranean. Nearly all the species are hardy in our London gardens. The principal concentration of species is in California and Japan. Taking the genera one by one, *Lilium* and *Fritillaria* have the distribution of the tribe; but passing from Asia to America, the latter stops short at the Rocky Mountains, whilst several of the Lilies reach the Atlantic seaboard. As already explained, the Old-World species usually differ from those of the New World in their bulbs. *Tulipa* is restricted to the Old World, reaching from Spain, Britain, and Scandinavia to Japan and the Himalayas. *Calochortus* is confined to Mexico and the west side of the Rocky Mountains, as if supplementing *Tulipa*. Of the five species of *Erythronium*, one is confined to the Old World and four to the New. *Lloydia* § *Gageopsis*, with three species, is Oriental and Siberian. *Lloydia serotina* is the most widely spread of all the Liliaceæ, and a unique instance of a petaloid monocotyledon of the north temperate zone with almost universal high-mountain and arctic distribution.

Tribus TULIPEÆ. Herbæ bulbosæ caulescentes, perianthii segmentis liberis, antheris secus margines dehiscentibus.

CLAVIS GENERUM.

* *Capsula loculicide trivalvis. Segmenta perianthii conformia.*

1. **LILIUM.** Perianthium deciduum segmentis patentibus albis vel splendide coloratis sæpissime punctato-papillosis unguibus foveola lineari præditis. Stamina leviter perigyna, antheris valde versatilibus. Stylus elongatus indivisus. Semina multa discoidea. *Orbis totius reg. temp. bor.*

2. **FRITILLARIA.** Perianthium deciduum, segmentis vix vel leviter falcatis, sæpissime vinoso-purpureis tessellatis, supra basin foveola brevi præditis. Stamina leviter perigyna, antheris obscure versatilibus. Stylus elongatus gracilis tricuspidatus vel indivisus. Semina multa discoidea. *Orbis totius reg. temp. bor. Amer. or. excl.*

3. **TULIPA.** Perianthium deciduum, splendide coloratum, diutine campanulatum, nunquam punctatum nec tessellatum. Stamina hypogyna antheris basifixis. Stylus sæpissime nullus. Semina multa discoidea. *Orbis veteris reg. temp. bor.*

4. Erythronium. Perianthium marcescens, segmentis arcte revolutis. Antheræ elongatæ basifixæ. Semina pauca turgida strophiolata. *Orbis totius reg. temp. bor.*

5. Lloydia. Perianthium marcescens, segmentis diutine ascendentibus. Antheræ parvæ basifixæ. Semina pauca angusta triquetra. *Orbis totius reg. temp. bor.*

** *Capsula septicide trivalvis. Segmenta exteriora sepaloidea.*

6. Calochortus. Genus solum. *Mexico et Am. bor. occid.*

1. Lilium, *Linn.*

Gen. 410; *Endl. Gen.* 1090; *Schultes, fil. Syst.* vii. xxxi *et* 399; *Kunth, Enum.* iv. 256 *et* 673; *Spae, Mémoire sur les espèces du genre Lis, in Mém. Acad. Brux.* vol. xix. (1847); *Duchartre, in Journ. Imp. Hort. France,* vols. iv. & v. (1870–1); *K. Koch, Wochen.* 1870; *Baker, Gard. Chron.* 1871; *Journ. Hort. Soc. Lond. new series,* iv. 39.—Martagon (*Rupp.*), *Salisb. Gen.* 56.

Perianthium corollinum deciduum 6-partitum infundibuliforme, segmentis æqualibus oblanceolatis flore expanso plus minus falcatis facie lævibus vel lamellato-punctatis, albis vel splendide flavis vel rubris, nunquam tessellatis, unguibus sulco nectarifero lineari distincto vel interdum obsoleto præditis. *Stamina* 6 æqualia obscure perigyna inclusa, filamentis elongatis filiformibus vel leviter complanatis plus minusve declinatis, antheris versatilibus medio dorsi introrsum affixis, secus margines totas dehiscentibus. *Ovarium* sessile cylindricum triloculare, ovulis in loculo crebris horizontalibus; *stylus* clavatus plus minus declinatus, ovario sæpissime longior, apice stigmatoso rotundato trilobato. *Capsula* coriacea obovoidea 6-angulata loculicide trivalvis, seminibus crebris discoideis marginatis, testa brunnea membranacea.—*Herbæ zonæ temperatæ borealis utriusque orbis, bulbis squamosis, foliis pluribus sparsis vel verticillatis, floribus racemosis vel solitariis speciosis æstivis.*

Subgenus I. Cardiocrinum. *Perianthium infundibuliforme segmentis oblanceolatis apice solum falcatis. Folia petiolata cordato-ovata.*

1. *cordifolium.* 2. *giganteum.*

Subgenus II. Eulirion. *Perianthium infundibuliforme segmen-*

tis oblanceolatis apice solum falcatis. Folia linearia vel lanceolata sessilia vel subsessilia.

Tubus ex basi ad medium vix ampliatus.

3. *philippense*. 4. *Wallichianum*. 5. *longiflorum*. 6. *neilgherrense*.

Tubus ex basi ad collum sensim ampliatus.

Folia sparsa :—

7. *japonicum*. 8. *Krameri*. 9. *nepalense*. 10. *candidum*. 11. *Belladonna*.

Folia verticillata :—

12. *Washingtonianum*.

Subgenus III. ARCHELIRION. *Perianthium apertum infundibuliforme, segmentis infra medium latissimis profunde patentibus. Stamina ab stylo declinato divergentia.*

Folia sessilia :—

13. *tigrinum*. 14. *oxypetalum*.

Folia breviter petiolata :—

15. *speciosum*. 16. *auratum*.

Subgenus IV. ISOLIRION. *Perianthium erectum, segmentis flore expanso falcatis, haud revolutis. Stamina ab stylo recto undique divergentia.*

Folia verticillata :—

17. *philadelphicum*. 18. *medeoloides*.

Folia sparsa ; stylus ovario brevior :—

19. *concolor*.

Folia sparsa ; stylus ovario longior :—

20. *bulbiferum*. 21. *croceum*. 22. *davuricum*. 23. *elegans*. 24. *Catesbæi*.

Subgenus V. MARTAGON. *Perianthium cernuum, segmentis valde revolutis. Stamina ab stylo declinato undique divergentia.*

Folia verticillata.

Americanæ.

Bulbi annui rhizomatiferi :—

25. *canadense*. 26. *pardalinum*. 27. *superbum*. 28. *Roezlei*.

Bulbi perennes haud rhizomatiferi :—

29. *columbianum*. 30. *Humboldtii*.

Gerontogeæ :

31. *Martagon*. 32. *avenaceum*. 33. *Hansoni*.

Folia sparsa.

Folia lanceolata multinervata.

Perianthium supra medium falcatum :—

34. *monadelphum.*

Perianthium infra medium revolutum :—

35. *polyphyllum.* 36. *ponticum.* 37. *carniolicum.*

Folia anguste linearia uni- vel paucinervata.

Segmenta perianthii medio 6–12 lin. lata :—

38. *testaceum.* 39. *Leichtlinii.* 40. *pseudo-tigrinum.*

Segmenta perianthii medio 3–6 lin. lata :—

41. *pomponium.* 42. *chalcedonicum.* 43. *callosum.*

44. *tenuifolium.*

§ Cardiocrinum (Endl.). *Perianthium* infundibuliforme, segmentis oblanceolatis longe unguiculatis, flore expanso apice solum falcatis intus haud papillosis, foveola carinali haud excavata. *Stamina* cum stylo parallela leviter declinata. *Folia* cordato-ovata reticulato-venosa longe petiolata. Ab stirpibus reliquis differt foliis Smilacoideis.

1. L. cordifolium, *Thunb. Linn. Trans.* ii. 332; *Schult. fil. Syst.* vii. 420; *Sieb. et Zucc. Flor. Jap. fasc.* iii. 33, t. 13. fig. 2 et 14; *Kunth, Enum.* iv. 268; *Miquel, Ann. Mus. Lug. Bat.* iii. 157.—Saussurea cordifolia, *Salisb. Linn. Trans.* viii. 11.—Hemerocallis cordata, *Thunb. Fl. Jap.* 143; *Gaertn. Fruct.* ii. 484, tab. 179, fig. 5. Bulbus ei *gigantei* omnino similis, sed minor, squamis crassioribus rugosioribus minus regularibus. Caulis 3–4-pedalis, pede infimo nudo, foliis primum in rosulam congestis. Folia primordialia sanguineo tincta, caulina ovata profunde cordata longe petiolata. Racemus in exemplis visis 4–10-florus vix pedalis, expansus 9–14 poll. latus, pedicellis floriferis patentibus 3–8 lin. longis, bracteis ovatis acutis caducis. Perianthium anguste infundibuliforme 4–6 poll. longum, tubo e basi 3–4 lin. ad collum 12–15 lin. latum sensim ampliato, segmentis e basi quadrantis superioris 6–9 lin. lata ad basin sensim angustatis. Stamina perianthio triente breviora, antheris luteis 4–6 lin. longis. Capsula ei *gigantei* similis sed rugosior. *Insulæ japonicæ et kurilenses in sylvis umbrosis, alt.* 400–600 *pedes.* Oldham 866! Wilford 1000! Maximowicz! Ad initium Augusti in hortis nostris florens.

2. L. giganteum, *Wallich, Tent. Fl. Nep.* 21, t. 12–13 (*excl. syn.*); *Kunth, Enum.* iv. 268; *Hook. Bot. Mag.* t. 4673; *Flore des Serres,* t. t. 771–2; *Belg. Hort.* iii. t. 21.—L. cordifolium, *D. Don, Prod. Nep.* 52, *non Thunb.* Bulbus globosus cæspitosus perennis 3–4-poll.

crassus, squamis ovatis subpatulis. Caulis 6–10-pedalis teres glaber viridis basi $1\frac{1}{2}$–2-poll. crassus. Folia primordialia viridia haud rubro tincta, caulina 12–20, ad basin caulis producta, sparsa ovata acuta basi profunde cordata, saturate viridia, reticulato-venosa, inferiora 12–18 poll. longa et lata, petiolis erecto-patentibus canaliculatis 9–12 poll. longis, superiora sensim minora petiolis brevioribus. Racemus 12–20-florus, 1–$1\frac{1}{2}$-pedalis, expansus ad pedem latitudine attingens. Bracteæ naviculares magnæ ovatæ acute caducæ. Pedicelli 3–12 lin. longi, primum subcernui, fructiferi ascendentes. Perianthium infundibuliforme suaveolens 5–6 poll. longum album intus purpureo et extus viridi tinctum, tubo e basi 6–7 lin. crassa ad collum 18–21 lin. latum sensim ampliato, segmentis oblanceolatis ad basin quadrantis superioris 9–12 lin. latis ad basin sensim angustatis, interioribus latioribus. Stamina perianthio triente breviora, filamentis deorsum applanatis subrectis 3–$3\frac{1}{2}$ poll. longis, antheris flavis 3–4 lin. longis, polline luteo. Ovarium cylindricum 1 poll. longum, stylo vix declinato sesqui vel subduplo brevius. Capsula late oblonga 2–3 poll. longa obtuse angulata apice umbilicata collo magno turbinato. *Regio temperata per Himalayam totam a Kumaon et Gurwhal ad Khasiam et Sikkim, alt.* 5000–10,000 *pedes.* "Floret sub pluviis, a mense Maio usque ad finem Julii," *Wallich.*

§ EULIRION (*Endl.*). *Perianthium* infundibuliforme segmentis oblanceolatis longe unguiculatis flore expanso apice solum falcatis intus haud papillosis raro punctatis foveola carinali obscura haud excavata. *Stamina* cum stylo parallela leviter declinata. *Folia* linearia vel lanceolata sessilia vel subsessilia. *Flores* suaveolentes sæpe albi nunquam splendide rubri nec flavi.

3. L. PHILIPPENSE, *Hort. Veitch.*; *Baker, Gard. Chron.* 1873, cum icone, *Bot. Mag.* t. inedit. Bulbus ovoideus perennis. Caulis $1\frac{1}{2}$–2-pedalis monocephalus gracilis teres glaber viridis vel purpureo maculatus. Folia 30–40 sparsa sessilia falcato-patentia anguste linearia 3–4 poll. longa, $1\frac{1}{2}$–2 lin. lata glabra nitide viridia trinervata. Perianthium horizontale album extus prope basin leviter viridi tinctum anguste infundibuliforme 7–8 poll. longum, tubo prope medium semipollicem crasso, segmentis oblanceolatis apice solum falcatis longe unguiculatis ad basin quadrantis superioris 15–18 lin. latis, facie planis impunctatis, carina obscura viridi. Stamina perianthio paulo breviora filamentis viridulis leviter declinatis 5–$5\frac{1}{2}$ poll. longis, antheris $2\frac{1}{2}$–3 lin. longis, polline flavo. Stylus cum ovario perianthio semipollicem brevior. *Insulæ Philippinæ*, Wallis in hort. Veitch.!

4. L. WALLICHIANUM, *Schultes fil. Syst.* vii. 1689; *Kunth, Enum.* iv.

267; *Wall. Cat.* 5076; *Hook. Bot. Mag.* t. 4561; *Lindl. et Paxt. Flow. Gard.* 1850, 120, *cum icone*; *Lemaire, Jard. Fleur.* t. 105, 106; *Flore des Serres*, t. 612.—L. Batisua, *Hamilt. MSS.*—L. japonicum, *D. Don, Prodr. Nep.* 52, non *Thunb.*—L. longiflorum, *Wallich, Tent. Fl. Nep.* 40, t. 29, non *Thunb.* Bulbus ovoideus 2–3 poll. longus squamis crassis albis acutis arcte imbricatis. Caulis 4–6-pedalis viridis strictus teres, basi horizontalis. Folia 50–60 subdistantia sparsa ascendentia sessilia acuminata glabra viridia inferiora 6–9 poll. longa, medio 3–6 lin. lata, trinervata, superiora breviora latiora sæpe 5-nervata. Flores sæpe solitarii interdum 2–3 suaveolentes ex apice pedunculi horizontales vel paulo ascendentes. Perianthium album extus basi viridulum 7–9 poll. longum, tubo basi 3–4 lin., 3 poll. supra basin 5–6 lin. crasso, segmentis oblanceolato-unguiculatis acutis ad basin quadrantis superioris 1½–2 poll. latis. Stamina perianthio 2 poll. breviora, antheris luteis 12–14 lin. longis. Ovarium 1½–2 poll. longum. Stylus cum ovario staminibus æquilongus. *Regio subtemperata Himalayæ centralis* (*Kumaon, Nepaul, &c.*) 3000–4000 *pedes*. Adsunt in hort. Leichtlin forma *minor* gracilior foliis circiter 25 distantibus inferioribus minoribus antheris 6 lin. longis et altera *multifolia* caule 5-pedali foliis 200 multo crebrioribus et numerosioribus.

5. L. LONGIFLORUM, *Thunb. Linn. Trans.* ii. 333; *Bot. Reg.* t. 560; *Lodd. Bot. Cab.* t. 985; *Bury, Hexand.* t. 8; *Kunth, Enum.* iv. 266; *Flore des Serres*, t. 270; *Miquel, Ann. Mus. Lug. Bat.* iii. 157. Bulbus perennis globosus flavescens squamis lanceolatis. Caulis 1–3-pedalis strictus glaber 3–4 lin. crassus viridis. Folia 20–40 sparsa ascendentia modice conferta nitide viridia glabra 5-nervata, centralia 3–4 poll. longa, medio 4–6 lin. lata, superiora distantiora breviora lanceolata. Flores sæpissime solitarii subhorizontales, interdum 2–6. Perianthium album suaveolens anguste infundibuliforme 5–7 poll. longum, tubo 2–3 poll. supra basin vix ampliato, segmentis oblanceolatis obtusis flore expanso quadrante superiore falcatis ad basin trientis superioris 12–18 lin. latis, interioribus latioribus. Filamenta alba 4–5 poll. longa, antheris flavis angustis 6–9 lin. longis, polline luteo. Ovarium 1–1½ poll. longum, cum stylo leviter declinato stamina vix superans. Stigma 4–4½ lin. crassum. Capsula anguste oblonga obtuse angulata apice umbilicata. *Regio temperata Japonia*, Oldham, 734! Maximowicz! &c. *China*, Fortune, 57, 66, Reeves! *Hongkong*, Capt. Urquhart. *Formosa*, Wilford, 548! Swinhoe! Oldham, 565! Capt. Champion. *Insulæ Loo-choo*, Capt. Beechey! C. Wright! De formis vide Duchartre, Obs. pp. 37–40. Stirps speciosissima omnium est L. EXIMIUM, *Court. Spae Mon.* 14; *Flore des Serres*, t. 283–4.—L. Jama-juri, *Siebold et De Vriese, Tuinbouw Flora*, i. 319, t. 11.—L. eximium Wilsonii, *Hort. Angl.*, habitu elatiore,

foliis latioribus floribus majoribus 8–9 poll. longis.—L. TAKESIMA et ABCHASICUM, *Hort.* ad *longiflorum* pertinent.

6. L. NEILGHERRENSE, *Wight, Ic.* t. 2031–2.—L. tubiflorum, *Wt. Ic.* t. 2033–4.—L. Wallichianum, *Wt. Ic.* t. 2035, non *Schultes, fil.*—L. Metzii, *Steud. in Hohen. Pl. Ind. Or. Exsic.* No. 954.—L. neilgherricum, *Hort. Veitch. Lemaire, Ill. Hort.* x. t. 353. Bulbus globosus 2–3-pollicaris squamis crassis lanceolatis. Caulis 2–3-pedalis strictus glaber basi longe decumbens. Folia 30–40 glabra nitide viridia ascendentia conferta sparsa firma distincte 3–5-nervata inferiora 3–4 poll. longa medio 12–13 lin. lata. Flores 1–3 ascendentes albi suaveolentes. Perianthium anguste infundibuliforme 6–7 poll. longum, tubo 2–3 poll. supra basin vix ampliato, segmentis oblanceolato-unguiculatis flore expanso apice solum falcatis cuspidatis apice callosis puberulis ad basin quadrantis superioris 15–18 lin. latis. Stamina perianthio paulo breviora, antheris angustis luteis 9–12 lin. longis polline flavo. Ovarium 12–14 lin. longum, cum stylo gracili 3–3½-pollicari staminibus æquilongum. Capsula oblonga obtuse angulata. *Ad montes Indiæ peninsularis Pulnies et Neilgherries, regio temperata,* Wight! Gardner! &c.—L. TUBIFLORUM et WALLICHIANUM, *Wight*, sunt formæ foliis minoribus angustioribus, medio 6–9 lin. latis, perianthii segmentis angustioribus 12–15 lin. latis.

7. L. JAPONICUM, *Thunb. Fl. Jap.* 133; *Mém. Acad. Péters.* iii. 205, tab. v. fig. 2; *Bot. Mag.* t. 1591; *Lodd. Bot. Cab.* t. 438; *Reich. Exot.* t. 88; *Kunth, Enum.* iv. 257; *Miquel, Ann. Mus. Lug. Bat.* iii. 157.—L. odorum, *Planch. Fl. des Serres*, t. 876–7. Bulbus globosus perennis. Caulis 1–2-pedalis strictus glaber purpureo maculatus. Folia 12–20 sparsa ascendentia atro-viridia eis *longifolii* tenuiora glabra lanceolata acuta 5–7-nervata medio 8–12 lin. lata inferiora 4–6 poll. longa. Flores suaveolentes sæpissime solitarii intus albi extus plus minusve purpureo tincti. Perianthium 5–6 poll. longum late infundibuliforme e basi ad collum 15–18 lin. latum sensim ampliato segmentis oblanceolato-unguiculatis obtusis flore expanso triente superiore falcatis, ad basin trientis superioris 15–18 lin. latis. Filamenta albido-viridia perianthio triente breviora, antheris crassis oblongis 5–6 lin. longis, polline rubro. Ovarium 12–15 lin. longum, cum stylo stamina paulo superans, stigmate 4 lin. crasso. Capsula obovoidea 2 poll. longa profunde obtuse 6-angulata. *Regio temperata, Japonia,* Maximowicz! *Insulæ Coreanæ,* Oldham, 869!—L. BROWNII, *Mielle, Flore des Serres,* t. 47 (L. japonicum, *Bury, Hexand.* t. 2) est forma elata grandiflora foliis 25–30, floribus majoribus extus magis purpureo saturatis.

8. L. KRAMERI, *Hort. Teutschel, Hook. fil. Bot. Mag.* t. 6058. Caulis 3–4-pedalis gracilis teres glaber purpureo maculatus. Folia distantia

sparsa 15–16 lineari-lanceolata acuminata brevissime petiolata firma viridia 5-nervata margine minute papillosa 6–9 poll. longa, 6–9 lin. lata. Perianthium suaveolens horizontale solitarium late infundibuliforme albidum leviter rubellum 6–7 poll. longum e basi ad collum sensim ampliatum, segmentis oblanceolato-oblongis flore expanso triente superiore falcatis supra medium, exterioribus 15–16, interioribus 20–21 lin. latis. Filamenta perianthio subduplo breviora antheris sordide brunneis 8–9 lin. longis polline rubro. Ovarium 15–18 lin. longum, stylo leviter declinato duplo brevius, stigmate 4–4½ lin. crasso. *Japonia*, ad initium Julii florens. Fortasse inter *speciosum* et *Japonicum* hybridum, foliis prioris, perianthio et antheris posterioris (*v. v. ex hort. Wilsoni*).

Var. BARRIANUM, *Baker*. Minor gracilior foliis confertioribus numerosioribus 2½–3 lin. latis trinervatis, perianthio candido 4 poll. longo, segmentis exterioribus medio 9–10, interioribus 15–18 lin. latis, ovario pollicari, stylo sesquipollicari, antheris semipollicem longis (*v. v. in hort. Barr.*).

9. L. NEPALENSE, *D. Don, Wern. Trans.* iii. 412; *Prodr. Nep.* 52; *Wallich, Pl. Asiat. Rar.* iii. 67, 291, Cat. 5078; *Kunth, Enum.* iv. 267.—L. ochroleucum, *Wall. in hb. Lindley.* Bulbum ignoro. Caulis 2–3-pedalis strictus gracilis glaber. Folia 30–50 sparsa lucide viridia ascendentia glabra lanceolata acuta vel linearia, inferiora 3–4 poll. longa medio 6–9 lin. lata distincte 5–7-nervata, superiora breviora distantia. Flores solitarii, vel pauci umbellati, leviter suaveolentes pedicellis basi verticillo foliorum reductorum bracteatis, vel pauci laxe racemosi, pedicellis inferioribus ascendentibus 2–3 poll. longis apice cernuis. Perianthium 4–5 poll. longum late infundibuliforme ochroleucum plus minus purpureo tinctum intus sæpe punctis sparsis præditum, segmentis oblanceolato-unguiculatis obtusiusculis flore expanso triente superiore falcatis, ad basin trientis superioris 6–12 lin. latis. Stamina perianthio quadrante breviora, antheris angustis 6–7 lin. longis, polline luteo. Ovarium 9–12 lin. longum, cum stylo stamina paullulum superans. Capsula ovata 2 poll. longa obtuse angulata. *Regio temperata Himalayæ occidentalis et centralis ab Gurwhal et Kumaon ad Nepaul,* Wallich! Thomson! Jacquemont! &c.

10. L. CANDIDUM, *L. Sp.* 433; *Bot. Mag.* t. 278; *Red. Lil.* t. 199; *Bury, Hexand.* t. 38; *Reich. Ic. Germ.* t. 445; *Kunth, Enum.* iv. 266. Bulbus ovoideus perennis magnus flavescens. Folia primordialia hyemalia sessilia oblanceolata 1½–2 poll. lata. Caulis 3–4-pedalis strictus glaber nigro-viridis. Folia 100 et plura sparsa ascendentia viridia acuta 2–5-nervata margine minute papillosa, centralia linearia, 3–6 poll. longa, infima oblanceolata obtusa, superiora sensim minora, suprema lanceolata 1–1½ poll. longa ad caulem adpressa. Racemus brevis deltoideus 6–20-florus, expansus 6–8 poll. latus floribus inferi-

oribus cernuis. Bracteæ lanceolatæ vel lineares. Pedicelli ascendentes, infimi 2–3-poll. longi sæpe bracteolati. Perianthium album suaveolens late infundibuliforme 2–3 poll. longum, e basi ad collum $1\frac{1}{2}$ poll. latum sensim ampliato segmentis flore expanso triente superiore falcatis obtusis apice puberulis supra medium 6–9 vel raro 12 lin. latis. Stamina perianthio triente breviora, antheris luteis 5–6 lin. longis. Stylus cum ovario stamina valde superans, perianthio subæquilongus. *Europa meridionalis a Corsica ad Persiam borealem et Caucasum.*

Var. STRIATUM, *Flore des Serres*, t. 735, est forma floribus extus purpureo-striatis.

Var. SPICATUM, *Hort.*, est forma monstrosa, floribus obsoletis, bracteis dilatatis albis petaloideis.

Var. PEREGRINUM, *Linn.*—L. peregrinum, *Mill. Dict.* No. 2; *Hayne, Arzne.* viii. t. 27; *Sweet, Brit. Flow. Gard.* ser. ii. t. 367. Gracilior, caule purpureo, foliis angustioribus, segmentis perianthii angustioribus longioribus acutioribus magis spathulatis. *Stirps hortensis diu culta, nondum in statu sylvestri cognita.*

11. L. BELLADONNA, *Hort. Leichtlin.* Caulis pedalis vel ultra gracilis glaber teres viridis. Folia circiter 20 lanceolata brevissime petiolata distantia viridia glabra acuminata patentia $1\frac{1}{2}$–2 poll. longa medio 3–4 lin. lata. Flores 1–3, terminales primum erecti, laterales expansi horizontales. Perianthium late infundibuliforme 3 poll. longum undique saturate rubellum, basi extus viridi tinctum, tubo e basi ad collum sensim ampliato, segmentis oblanceolatis impunctatis flore expanso tertio superiore falcatis, ad basin trientis superioris 8–12 lin. latis, interioribus latioribus. Stamina perianthio quadrante breviora, antheris angustis rubellis 3–4 lin. longis. Stylus leviter declinatus, cum ovario stamina superans, stigmate parvo. Habitus *L. speciosi* cum perianthio *L. candidi* sed rubello. Ex tabula Leichtliniana descriptum. *Fortasse hybrida hortensis inter* speciosum *et* longiflorum.

12. L. WASHINGTONIANUM, *Kellogg, Proc. Calif. Acad.* ii. 13; *Wood, Proc. Acad. Phil.* 1868, 166; *Baker, Gard. Chron.* 1871, 709, t. 142; *Regel, Gartenf.* t. 170; *Flore des Serres*, t. 1975–6.—L. Bartramii, *Nuttall, herb.* Bulbus obliquus albus subrhizomatosus, squamis parvulis lanceolatis. Caulis 3–5-pedalis teres glaber viridis apice racemosus infra racemum nudus. Folia in verticillis 6–9 5–12-foliatis disposita vel superiora sparsa oblanceolata patentia sessilia glabra 3–4 poll. longa supra medium 8–12 lin. lata acuta viridia e medio ad basin sensim angustata venulis lateralibus obliquis indistinctis. Racemus $\frac{1}{2}$–1-pedalis 12–20-florus, expansus 8–9 poll. latus, pedicellis ascendentibus inferioribus 2–4 poll. longis bracteis parvis oblanceolatis vel linearibus. Perianthium suaveolens infundibuliforme albidum $2\frac{1}{2}$–3

poll. longum intus leviter rubello vel purpureo tinctum punctis paucis parvis lilacinis sparsis, segmentis oblanceolatis e basi trientis superioris 6–8 lin. lata ad basin sensim angustatis, flore expanso triente vel quadrante superiore falcatis. Stamina perianthio quadrante breviora, antheris luteis 5–6 lin. longis. Ovarium 8–9 lin. longum, stylo curvato subtriplo brevius. *California in sylvis montium Sierra Nevada, &c.*, Jeffray, 1139! Bridges, 270; W. Lobb, 248!

Var. PURPUREUM, *Hort. Bull.* Minor, gracilior, caule 1–1½-pedali, foliis 1–1½ poll. longis, floribus 4–8 umbellatis, segmentis magis falcatis 5–6 lin. latis vinoso-purpureo saturatis punctis minutis secus faciem totam sparsis, stylo 9–12 lin. longo, antheris 2–3 lin. longis. *California e valle Yosemite. In hortis Angliæ anno 1873 late dispersa.*

§ ARCHELIRION, *Baker*. *Perianthium* late infundibuliforme vel campanulatum, segmentis ovato- vel oblongo-lanceolatis flore expanso profunde falcatis, facie punctatis, deorsum papillosis, sulco carinali profunde excavato. *Stamina* ab stylo declinato late divergentia.

13. L. TIGRINUM, *Gawl. Bot. Mag.* t. 1237; *Red. Lil.* t. 395 et 475; *Kunth, Enum.* iv. 259.—L. speciosum, *Andrews, Bot. Rep.* t. 586, non *Thunberg*. Bulbus perennis globosus squamis oblongo-lanceolatis acutis. Caulis 2–4-pedalis nigrescens vel brunneus albo-araneosus. Folia saturate viridia sparsa glabra ascendentia firma linearia 3–4 poll. longa medio 3–6 raro 9 lin. lata 5–7-nervata, superiora breviora bulbillis rubro-brunneis in axillis prædita. Racemus 3–10- raro 20–25-florus latus deltoideus expansus interdum 12–15 poll. longus et latus bracteis parvis ovatis, pedicellis divaricatis strictis apice cernuis sæpe bracteolatis inferioribus 3–4 poll. longis. Perianthium 3–4 poll. longum, splendide rubrum vel aurantiaco tinctum, segmentis late falcatis acuminatis apice callosis puberulis, infra medium 9–18 lin. latis, interioribus multo latioribus, omnibus facie punctis magnis nigro-purpureis præditis, unguibus papillis melanocephalis copiosis præditis, foveola carinali profunde excavata marginibus pubescentibus. Filamenta coccinea 2–2½ poll. longa, antheris nigrescentibus 6–8 lin. longis polline coccineo. Ovarium viride 9–12 lin. longum. Stylus 1½–2-pollicaris valde declinatus. Capsulam non vidi. *Japoniæ et Chinæ regio temperata.* Ad finem Julii et per totum Augusti floret. De formis cultis vide *T. Moore, Florist,* 1873, 14.—SPLENDENS, *Flore des Serres,* t. 1932, *Wilson, Journ. Hort.* 1873, 251, *cum icone, Floral Mag.* t. 509 (Leopoldi, *Hort.*), est forma grandiflora valde serotina punctis majoribus foliis latioribus caule minus araneoso.—FORTUNEI est forma minus serotina caule dense albido-araneoso.—LISHMANNI, *Moore, Florist,* 1873, 13, *cum icone,* est forma punctis ad dimidium centrale segmentorum restrictis basi et apice impunctatis.—ERECTUM pedicellis minus divaricatis floribus suberectis.

14. L. OXYPETALUM, *Baker.*—Fritillaria oxypetala, *Royle, Ill. Him.* 388? *Hook. Bot. Mag.* t. 4731; *Lemaire, Jard. Fleur.* t. 422.—Lilium triceps, *Klotsch, Reise, Wald.* 33, t. 93. Bulbus oblongus squamis paucis lanceolatis acuminatis 1½ poll. longis. Caulis gracilis teres viridis monocephalus glaber 1–1½-pedalis. Folia 20–30 primum dense rosulata sparsa ascendentia viridia glabra lanceolata vel linearia 2–3 poll. longa medio 3–6 lin. lata. Perianthium horizontale late infundibuliforme 15–18 lin. longum segmentis oblongis acutis late imbricatis medio 8–9 lin. latis purpurascentibus dorso viridi tinctis faciei dimidio inferiore purpureo punctatis basi arcte papillosis, ungue brevi profunde sulcato extus barbato. Stamina perianthio triente breviora, antheris purpurascentibus 3–4 lin. longis, filamentis divergentibus. Ovarium clavatum 5–6 lin. longum. Stylus rectus ovario brevior. Capsula obovoideo-oblonga 9–12 lin. longa obtuse angulata valvis apice emarginatis. *Regio temperata Himalayæ occidentalis,* Hoffmeister. *Kumaon ad Pindari alt.* 12500 *pedum,* Strachey et Winterbottom!

15. L. SPECIOSUM, *Thunb. Linn. Trans.* ii. 332; *Bot. Reg.* t. 2000; *Zuccarini, in Sieb. Fl. Jap.* iii. 31. t. 12 et t. 13. fig. 1; *Kunth, Enum.* iv. 259; *Bot. Mag.* t. 3785; *Flore des Serres,* t. 276.—L. lancifolium, *Mussche, Paxt. Mag.* v. 267, *cum icone, non Thunb.* Bulbus perennis globosus brunneus vel rubro-brunneus squamis lanceolatis pollicem longis laxiusculis. Caulis 2–3-pedalis strictus teres glaber viridis vel rubello maculatus. Folia 12–20 sparsa distantia brevissime petiolata petiolo ad caulem adpresso oblongo-lanceolata acuta vel acuminata nitide viridia firma glabra basi rotundata, inferiora 5–6 poll. longa medio 15–18 lin. lata, distanter distincte 5–7-nervata. Racemus deltoideus 3–10-florus pedicellis divaricatis bracteolatis, infimis 3–5 poll. longis, centralibus apice suberectis, lateralibus apice cernuis. Perianthium 3–4 poll. longum, segmentis ovato-lanceolatis profunde falcatis 12–21 lin. latis, interioribus latioribus, albis sæpissime plus minusve rubro suffusis, facie rubro punctatis papillis copiosis, sulco carinali profundo glabro. Filamenta late divergentia 2½–3 poll. longa, antheris angustis 9–12 lin. longis polline croceo vel rubro. Ovarium 1 poll. longum; stylus gracilis valde declinatus 1½–2½-pollicaris. Capsula obovoideo-oblonga 2 poll. longa obtuse angulata apice umbilicata. *Japoniæ regio temperata ad initium Augusti florens.* De formis cultis vide *Masters, Gard. Chron.* 1872, p. 1522.—PUNCTATUM, *Lemaire* (lancifolium, *Paxt. Mag.* v. t. 267, albiflorum, *Hook. Bot. Mag.* t. 3785), est forma albiflora punctis et papillis rubris.—TAMETOMO, *Zucc. et Spae.* (eximium, *Hort. olim*; L. Broussartii, *Morren, Mém. Acad. Roy. Brux. Feb.* 1834, *cum icone*; vestale, *Masters, loc. cit.*), est forma albiflora impunctata.—KRÆTZERI, *Duchartre,* est forma albiflora segmentis dorso late viridi vittatis.

16. L. AURATUM, *Lindl. Gard. Chron.* 1862, 644*b*; *Hook. Bot. Mag.*

t. 5338; *Flore des Serres*, t. 1528–1531; *Ill. Hort.* ix. t. 338; *Rev. Hort.* 1867, t. 371; *Miquel, Ann. Mus.* iii. 156.—L. Dexteri, *Hovey, Mag. Hort. Aug.* 1862.—L. Wittei, *Suring. in Koch, Wochens.* 1867, 294.—L. speciosum imperiale, *Hort, Siebold.* Bulbus omnino *L. speciosi.* Caulis 2–4-pedalis viridis vel purpureo tinctus gracilis teres glaber. Folia 20–30 sparsa distantia brevissime petiolata petiolo ad caulem adpresso lanceolata acuminata saturate viridia glabra firma 5-nervata, inferiora 6–9 poll. longa 9–15 lin. lata. Racemus deltoideus 3–10-florus pedicellis divaricatis bracteolatis. Perianthium 5–7 poll. longum, segmentis late falcatis medio 1–2 poll. latis, interioribus latioribus, albis medio sæpissime aureo-vittatis, punctis purpureis sparsis deorsum facie papillosis, foveola carinali distincta marginibus glabris. Filamenta 3–3½ poll. longa, antheris angustis 9–12 lin. longis, polline rubro. Ovarium 12–14 lin. longum; stylus gracilis valde declinatus 2½–3½-pollicaris. Capsula 3-pollicaris oblonga, ei *speciosi* longior et angustior apice emarginata. *Japonia,* Oldham, 186! Maximowicz! Formæ adsunt floribus rubro-vittatis ad *speciosum* vergentes; et foliis 25–30 latioribus et foliis 40–50 angustioribus.—L. Wittei, *Suringar,* est varietas floribus albis impunctatis.

§ Isolirion, *Baker.* *Perianthium* late infundibuliforme diutine erectum, sæpissime splendide rubrum vel flavum, segmentis oblongo-lanceolatis basi spathulatis vel unguiculatis, facie punctatis et papilloso-lamellatis foveola carinali profunde excavata præditis. *Stamina* ab stylo erecto undique divergentia.

17. L. philadelphicum, *L. Sp.* 435; *Miller, Ic.* t. 165. fig. 1; *Bot. Mag.* t. 519; *Red. Lil.* t. 104; *Lodd. Bot. Cab.* t. 976; *Herb. Amat.* t. 92; *Bot. Reg.* t. 594; *Kunth, Enum.* iv. 263. Bulbus parvus annuus stoloniferus squamis fragilibus crassis subclavatis. Caulis 1–3-pedalis viridis gracilis teres glaber. Folia 20–30 lanceolata vel linearia patentia tenuia glabra subtiliter nervata sessilia, inferiora 3–4 poll. longa medio 3–6 lin. lata in verticillos 4–6 6–8-foliatos disposita vel pauca vel multa sparsa. Flos 1 terminalis erectus vel pauci umbellati, pedicellis 2–3 poll. longis ascendentibus basi verticillo foliorum magnorum bracteatis. Perianthium 2–3 poll. longum, splendide rubro-luteum, segmentis oblongo-lanceolatis medio 6–10 lin. latis basi unguiculo distincto 6–8 lin. longo præditis, faciei dimidio inferiore punctis magnis purpureis sparsis, foveola glabra profunde excavata marginibus unguibus revolutis marginata. Stamina perianthio triente breviora, antheris 5–6 lin. longis polline rubro. Ovarium 9–10 lin. longum, stylo subduplo brevius. Capsula anguste obovoidea obtuse angulata. *America borealis ab Canada ad Carolinam.*

Var. L. andinum, *Nuttall, Gen.* i. 221.—L. umbellatum, *Pursh, Flora,*

i. 229.—Var. wansharaicum, *Hort, Leicht.*; *Duchartre, Obs.* 88. Folia linearia omnia sparsa. *Montes Scopulosi,* Douglas! Bourgeau! &c.

18. L. MEDEOLOIDES, *A. Gray, Mem. Amer. Acad.* vi. 415; *Miquel, Ann. Mus. Lug. Bat.* iii. 156.—L. maculatum, *Thunb. Linn. Trans.* ii. 334; *Mem. Acad. Petrop.* iii. 204, tab. 5. fig. 1?—L. canadense, *Thunb. Fl. Jap.* 204? Caulis 1–2-pedalis gracilis glaber teres flexuosus. Folia pleraque in verticillum unicum 7–14-foliatum supra medium caulis dispositum aggregata, oblanceolata patentia tenera glabra viridia 4–6 poll. longa, supra medium 9–15 lin. lata, acuta venis lateralibus 2–4 distinctis, pauca reducta supra verticillum sparsa. Flores solitarii vel 2–3 umbellati, pedicellis brevibus apice erectis. Perianthium 12–15 lin. longum erectum aperte infundibuliforme splendide aurantiaco-rubrum, punctis paucis vinosis intus decoratum, segmentis lanceolatis e basi leviter falcatis apice callosis canaliculatis puberulis medio 3–4 lin. latis, basi leviter spathulatis, foveola carinali obscura glabra. Filamenta perianthio duplo breviora, antheris 4–5 lin. longis. Ovarium clavatum 4 lin. longum, stylo erecto paulo brevius. *Japonia prope Hakodadi,* C. Wright. *Insula Koreana Herschel, in sylvis inundatis, mense Junio florens,* Oldham, 873! Ad *Martagon* et *avenaceum* habitu magis accedit, sed facile distinguitur floribus erectis segmentis falcatis haud revolutis genitalibus brevibus.

19. L. CONCOLOR, *Salisb. Parad.* t. 47; *Kunth, Enum.* iv. 259 et 673; *Fisch & Mey. Ind. Sem.* 1839, 55.—L. sinicum, *Lindl. in Paxt. Flow. Gard.* vol. ii. *Misc.* 115, t. 193; *Lemaire, Ill. Hort.* t. 100; *Van Houtte, Flore des Serres,* t. 1206. Bulbus ovoideus perennis parvus squamis paucis albidis oblongis acutis. Caulis gracilis subpedalis obscure puberulus, purpureo suffusus. Folia 20–30 ascendentia sparsa lanceolata saturate viridia acuta 2½–3 poll. longa medio 4–6 lin. lata obscure 7-nervata margine papilloso-ciliata. Flores 1–3, pedicellis puberulis purpureis ascendentibus 1½–2 poll. longis interdum bracteolatis. Perianthium 15–18 lin. longum, intus obscure coccineum immaculatum, extus pallidius, segmentis late falcatis lanceolatis medio 4–6 lin. latis apice callosis puberulis basi paullulum papillosis, foveola carinali excavata marginibus glabris præditis. Filamenta perianthio duplo breviora, antheris 3–4 lin. longis polline rubro. Ovarium clavatum 5–6 lin. longum profunde sulcatum; stylus clavatus 3–4 lin. longus brevissimus omnium. Capsula 1 poll. longa obovoideo-oblonga obtuse angulata. *China, ad finem Junii florens.*—L. CONCOLOR, *Bot. Mag.* 1165, est forma segmentis intus prope basin punctis paucis obscuris præditis.

Var. L. BUSCHIANUM, *Lodd. Bot. Cab.* t. 1628.—L. pulchellum, *Rev. Hort.* 1862, 131, *cum icone.*—L. concolor, var. sinicum, *Bot. Mag.* t. 6005. Interdum elatior, bulbo majore solitario squamis paucis

latis, foliis angustioribus saturate viridibus, floribus interdum 4–6, perianthii segmentis paulo latioribus intus splendide coccineis, faciei dimidio inferiore punctis parvis nigrescentibus numerosis sparsis, capsula anguste obovoidea sesquipollicari apice umbilicata. *Siberia meridionalis.*

Var. L. PARTHENEION, *Sieb. et De Vriese, Tuinbow Flora*, ii. 341, *cum icone*, ab *Buschiano* vix differt nisi habitu sæpe graciliore, foliis nitide viridibus et bulbis cæspitosis. *Japonia.*—L. CORIDION, *Sieb. et De Vriese, loc. cit., Duchartre, Obs.* 42, est stirps eadem floribus flavis.

Var. L. PULCHELLUM, *Fisch. & Mey. Ind. Sem. Petr.* 1839, 56; *Kunth, Enum.* iv. 266, 676; *Regel, Gartenfl.* 1860, 81, t. 284. fig. 2. Bulbus ovoideus vix pollicaris. Caulis gracillimus subpedalis, foliis 12–20 anguste linearibus ascendentibus 2–2½ poll. longis 1½–2 lin. latis. Perianthium sæpe solitarium rubrum, 12–15 lin. longum, segmentis oblanceolatis obtusis medio 3–5 lin. latis, dimidio inferiore punctis pluribus nigrescentibus minutis decoratis. Filamenta 5–6-linearia. Ovarium 3–4-lineare, stylum superans. *Siberia orientalis; et forma flaviflora in Japonia culta*, Maximowicz! *In montosis lapidosis Mongoliæ Chinensis*, Meyer et Turczaninow in herb. DC.!

20. L. BULBIFERUM (*Parkinson, Parad.* 37, t. 2), *L. Sp.* 433 *ex parte*; *Jacq. Fl. Austr.* t. 226; *Bot. Mag.* t. 1018; *Fisch. & Mey. Ind. Sem.* 1839, 54; *Kunth, Enum.* iv. 264, 674; *Regel, Gartenfl.* 1872, 231, *cum icone bulbi.* Bulbus ovoideus perennis squamis paucis latis acutis. Surculi primordiales lati obtusi rubro tincti. Caulis 2–4-pedalis strictus sulcatus purpureo maculatus sursum albo-araneosus. Folia pauciora quam in *croceo* et magis ascendentia, inferiora circiter 3 poll. longa medio 3–6 lin. lata, superiora reducta, in axillis bulbillifera. Flores in exemplis sylvestribus 1–3, in cultis sæpe plures umbellati vel deltoideo-racemosi. Pedicelli crassi breves purpureo maculati albo araneosi. Perianthium 2–2½ poll. longum erectum inodorum splendide rubrum sæpe fundo aurantiaco tinctum, segmentis oblongo-spathulatis, medio 9–15 lin. latis, interioribus minus unguiculatis quam in *croceo*, omnibus facie nigro-punctatis deorsum valde lamellatis et papillosis, sulco semipollicari profunde excavato, marginibus pilosis. Filamenta 18–21 lin. longa, antheris 3–4 lin. longis, polline rubro. Ovarium 7–8 lin. longum, stylo duplo brevius. Capsula 1½ poll. longa obovoidea obtuse 6-angulata apice umbilicaca. *Europa centralis et Scandinavia austro-orientalis*, in hortis nostris inter priores per mensem Junii florens, ante *croceum* et *davuricum.*—L. LATIFOLIUM, *Link, Enum.* i. 321, est forma magna latifolia hortensis.—L. HUMILE, *Miller, Dict.* no. 4, est forma parva foliis angustis.—L. PUBESCENS, *Bernh. Kunth, Enum.* iv. 265, est verisimiliter forma hortensis pedunculis valde araneosis. De formis vide Parkins. Parad. 38.

21. L. CROCEUM (*Fuchs*), *Chaix in Vill. Delph.* i. 322; *Kunth, Enum.* iv. 265 *et* 675; *Fisch. & Mey. Ind. Sem.* vi. 56; *Gren. Fl. France,* iii. 182.—L. bulbiferum, *DC. Fl. France,* iii. 202; *Bot. Mag.* t. 36, *et auct. magna ex parte.*—L. aureum, *Parkinson, Paradisus,* 37, t. 3. Bulbus globosus perennis squamis magnis ovato-lanceolatis medio haud constrictis. Surculi primordiales lati obtusi rubro tincti. Caulis 3–6-pedalis robustus sulcatus viridis sursum purpureo maculatus plus minusve araneosus. Folia 50–100 sparsa conferta patentia vel infima leviter squarrosa linearia, inferiora 3–4 poll. longa 3–4 lin. lata 3–5-nervata, sessilia glabra firma, nunquam in axillis bulbillifera. Flores in exemplis sylvestribus sæpe solitarii, in cultis sæpe 10–20 in racemum deltoideum vel umbellam dispositi. Pedicelli ascendentes 2–3 poll. longi albo-araneosi. Perianthium erectum late infundibuliforme 2–2½ poll. longum, expansum 3 poll. latum primum extus albo-araneosum, segmentis exterioribus oblongo-lanceolatis infra medium 8–9 lin. latis basi spathulatis, interioribus ovato-lanceolatis infra medium 12–14 lin. latis basi distincte unguiculatis, omnibus splendide aurantiacis vix coccineo tinctis apice cuspidatis puberulis flore expanso imbricatis copiose punctatis et valde lamellato-papillosis, sulco semipollicem longo profunde excavato marginibus pilosis. Filamenta 15–18 lin. longa, antheris 4 lin. longis, polline rubro. Ovarium 8–9 lin. longum; stylus 12–14 lin. longus. Capsula obovoidea 1½ poll. longa subacute 6-angulata. *Helvetia, Gallia, Italia borealis in hortis sub formis plurimis diu culta ad initium Julii post* bulbiferum *florens.*

22. L. DAVURICUM, *Gawl. Bot. Mag. sub* t. 1210; *Kunth, Enum.* iv. 264; *Regel, Gartenflora,* t. 740, et 1872, 295.—L. pennsylvanicum, *Gawl. Bot. Mag.* t. 872.—L. spectabile, *Link, Enum.* i. 321; *Reich. Ic. Exot.* t. 30; *Fisch. & Mey. Ind. Sem.* vi. 58; *Kunth, Enum.* iv. 676; *Regel, Gartenf.* t. 349, 1872, 231, *cum icone bulbi.* Bulbus globosus perennis squamis parvis panduriformibus acutis albis fragilibus medio constrictis. Surculi primordiales angusti acuti brunneo tincti. Caulis 2–3-pedalis gracilis viridis sursum leviter albo-araneosus. Folia 20–50 ascendentia sessilia linearia trinervata, inferiora 4–5 poll. longa medio 3–4 lin. lata nunquam in axillis bulbillifera. Flores in exemplis sylvestribus sæpe solitarii, in cultis pauci umbellati vel breviter racemosi, pedicellis nudis vel leviter araneosis. Perianthium splendide rubrum, 2½–2 poll. longum expansum 4½–3 poll. latum segmentis oblongo-lanceolatis infra medium 9–12 lin. latis flore expanso vix imbricatis minus punctatis et lamellatis quam in *croceo* et *bulbifero,* basi spathulatis, sulco profunde excavato 8–9 lin. longo marginibus pilosis. Filamenta rubra 18–21 lin. longa, antheris 5–6 lin. longis, polline rubro. Stylus ovario subduplo longior. Capsula 1½–2 poll. longa obtuse angulata. *Siberia centralis et orientalis a montibus Altai*

ad Kamtchatkam. In hortis nostris cum croceo *mense Julio post* bulbiferum *florens*.—L. UMBELLATUM *hort. plur.* est *davuricum*, forma luxurians hortensis. De formis vide *Regel, Gartenfl.* 1872, 295.

23. L. ELEGANS, *Thunb. Mem. Acad. Petr.* iii. 203, tab. 3. fig. 2.—L. bulbiferum, *Thunb. Linn. Trans.* ii. 333.—L. philadelphicum, *Thunb. Fl. Jap.* 135.—L. Thunbergianum, *Schultes fil. Syst. Veg.* vii. 415; *Lindl. Bot. Reg.* 1839, t. 38; *Maund. Bot.* t. 158; *Regel, Gartenfl.* 1872, 296. —L. aurantiacum, *Paxt. Mag.* vii. 1[illegible], *cum icone*. Bulbus eis *bulbiferi* et *crocei* similis. Caulis subpedalis viridis glaber vel leviter araneosus vel pilosus robustus sulcatus. Folia 20–30 ascendentia sparsa firma saturate viridia glabra distincte 5–7-nervata, inferiora 3–4 poll. longa, superiora breviora, medio 6–12 lin. lata, in axillis haud bulbillifera. Perianthium sæpissime solitarium 3–3½ poll. longum, expansum 5–6 poll. latum rubro-aurantiacum, segmentis oblongo-spathulatis obtusis vix punctatis multo minus lamellatis et papillosis quam in *davurico*, foveola distincte excavata 8–9 lin. longa marginibus pilosis, exterioribus medio 12–13, interioribus 15–18 lin. latis. Filamenta 1½–2-pollicaria, antheris 4–5 lin. longis. Ovarium 1 poll. longum, stylo sesqui brevius. Capsula obovoidea 2 poll. longa subacute 6-angulata, sesqui longiora quam lata. *Japonia, in hortis nostris Julio ineunte florens, sub formis perplurimis, quarum sequentes sunt notabiles* :—

Var. 1. BREVIFOLIUM, *Baker & Dyer, Gard. Chron.* 1872, 1356.—L. alternans *hort.* Folia latiora breviora, inferiora 2–2½, superiora 1–1½-pollicaria, omnia 7–9 lin. lata saturate viridia. Perianthium minus apertum, ubique pallide rubrum, fundo punctis paucis nigris decoratum. Filamenta et stylus paulo longiora.

Var. 2. BICOLOR, *Moore, Floral Mag.* t. 104.—L. pictum *hort., Siebold.*—L. aurantiacum *hort., Krelaye.* Caulis vix pedalis, foliis circiter 40 angustioribus inferioribus 4–6 lin. latis. Perianthium 3–3½ poll. longum, segmentis latissimis omnium, interioribus 18–21 lin. latis, centro luteo, lateribus rubris, punctis prope basin paucis.

Var. 3. PARDINUM, *Moore, Florist*, 1861, 121, *cum icone*, ab 2 vix differt, nisi caule elatiore 2–3-pedali, floribus paucis umbellatis.

Var. 4. ALUTACEUM, *Baker & Dyer, Gard. Chron. loc. cit.*—L. Thunbergianum aureum nigro-maculatum, *Flore des Serres*, t. 1627. Caulis nanus, foliis circiter 30, flore solitario, perianthio pallide armeniaco segmentis interioribus 12–13 lin. latis punctis copiosis purpurascentibus dimidio inferiore decoratis.

Var. 5. ARMENIACUM, *Baker & Dyer, loc. cit.* Caulis subpedalis, foliis 30–40 inferioribus linearibus, floribus 1–2 aurantiacis impunctatis, lamellis et papillis obsoletis, segmentis 9–12 lin. latis.

Var. 6. CITRINUM *hort., Wilson*, ab *armeniaco* vix differt nisi caule 2–2½-pedali, foliis lanceolatis, floribus 2–3.

Var. 7. SANGUINEUM, *Lindl. Bot. Reg.* 32, t. 50. Caulis 1–1½-pedalis

foliis circiter 40 lanceolatis. Flores 1–2, segmentis latis sanguineo-rubris, paullo aurantiaco commixtis, punctis paucis minutis prope basin decoratis, papillis et lamellis subobsoletis.

Var. 8. ATROSANGUINEUM, *Baker & Dyer, loc. cit.*—L. coruscans *hort.* Caulis 1–1½-pedalis, foliis lanceolatis, floribus sæpissime solitariis, segmentis latis, saturate rubris, dimidio inferiore punctis numerosis decoratis, papillis et lamellis copiosis parum elevatis.—L. hæmatochroum, *Lemaire, Ill. Hort.* t. 503, est forma similis floribus obscurioribus livide rubris.

Var. 9. L. FULGENS, *Morren, in Spae Mem.* 29; *Lemaire, Ill. Hort.* t. 657, ad *davuricum* accedit caule 1–1½-pedali, foliis 40 linearibus, floribus sæpe 4–6 saturate rubris, punctis lamellis et papillis pæne obsoletis.—L. VENUSTUM, *Kunth, Flore des Serres,* t. 652, est forma similis flore splendidiore magis aurantiaco commixto.—L. WILSONI *hort., teste Leichtlin,* est verisimiliter inter *elegantem* et *speciosum* hybridum.

24. L. CATESBÆI, *Walt. Fl. Carol.* 123; *Bot. Mag.* t. 259; *Lodd. Bot. Cab.* t. 807; *Sweet, Brit. Flow. Gard.* ser. ii. t. 185; *Kunth, Enum.* iv. 263.—L. spectabile, *Salisb. Stirp. Rar.* t. 5, *non Link.*—L. carolinianum, *Catesby, Car.* ii. t. 58, *non Michx.* Bulbus ei *philadelphici* omnino similis. Caulis 1–2-pedalis gracilis teres glaber viridis. Folia 20–30 sparsa ascendentia glabra viridia lanceolata vel linearia, inferiora 2–3 poll. longa 4–6 lin. lata, superiora sensim minora. Perianthium solitarium erectum late infundibuliforme 3–4 poll. longum splendide rubro-aurantiacum, segmentis oblongo-lanceolatis medio 6–12 lin. latis longe distincte cuspidatis basi ungue canaliculato marginibus revolutis 9–15 lin. longo præditis facie punctis purpureis sparsis. Filamenta 2½–3 poll. longa, antheris angustis 4–6 lin. longis polline rubro. Ovarium 9–12 lin. longum; stylus gracilis ovarium duplo superans. *America borealis ab Georgia et Carolina ad Floridam.*

§ MARTAGON (*Endl.*). *Flores* racemosi cernui punctati sæpissime splendide rubri vel aurantiaci, *perianthio* late campanulato, *segmentis* lanceolatis profunde valde falcatis, *foveolis* profunde impressis, *staminibus* ab stylo declinato undique divergentibus.

25. L. CANADENSE, *Linn. Sp.* 435; *Bot. Mag.* t. 800 and 858; *Kunth, Enum.* iv. 258; *Bury, Hexand.* t. 12; *Flore des Serres,* t. 1174.—L. penduliflorum, *DC. in Red. Lil.* t. 105.—L. pendulum, *Spae, Mem.* 28.—Martagon sive Lilium canadense maculatum, *Parkins. Parad.* 32, t. 2. Bulbus annuus, stolones 5–6 poll. longos emittens, squamis crassis obtusis vix semipollicem longis. Caulis 1½–3-pedalis gracilis

glaber teres viridis. Folia sæpe in verticillos regulares 4–5 distantes 4–8-foliatos disposita, sed verticillis interdum plus minus diffractis, oblanceolata acuta 3–4 poll. longa supra medium 6–9 lin. lata viridia tenuia 5–7-nervata venis interdum ciliatis. Flores 1 vel pauci umbellati vel corymbosi pedicellis 2–6 poll. longis apice valde cernuis interdum bracteolatis. Perianthium 2–2½ poll. longum, late infundibuliforme, splendide rubro-aurantiacum, segmentis oblanceolatis 6–7 lin. latis supra medium falcatis facie copiose vinoso punctatis, deorsum lamellatis, foveola distincte impressa marginibus glabris. Filamenta perianthio triente breviora, antheris 4–6 lin. longis. Ovarium 8–9 lin. longum, stylo subrecto paulo brevius. Capsula turbinata obtuse angulata 1½ poll. longa septis teneris, apice haud umbilicata. *America borealis orientalis a Canada ad Georgiam.* Ab sectione *Martagon* cum *monadelpho* ad *Eulirion* recedit, perianthio infundibuliformi flore expanso supra medium solum revoluto. Var. PENDULIFLORUM *hort.*, *Leicht.*, est forma segmentis ad vel infra medium revolutis.

Var. 1. L. PARVUM, *Kellogg, Proc. Calif. Acad.* ii. 179, t. 52; *Regel, Gartenflora*, t. 725; *Duchartre, Obs.* 98. Bulbus et perianthium formæ typicalis, sed habitu in hortis nostris minore graciliore. Caulis viridis 1–1½-pedalis. Folia superiora sæpissime sparsa. Flores multo minus cernui, interdum suberecti. Perianthium 15–18 lin. longum, splendide rubro-aurantiacum, copiose punctatum, segmentis acutis 3–5 lin. latis supra medium falcatis. Antheræ oblongæ 2–3 lin. longæ. Ovarium 3–4 lin. longum, stylo subrecto duplo brevius. *California ad montes Sierra Nevada, altit.* 6000 *pedes,* Jeffray, 1283! Teste Kellogg ad 5 pedes altitudine pervenit floribus 50.

Var. 2. WALKERI, *Wood, Proc. Amer. Acad.* 1868, 166. Caulis 3-pedalis et ultra. Folia tenera angustiora in verticillos regulares 7–8-foliatos valde distantes disposita, inferiora 4–5 poll. longa 4–5 lin. lata, venis præter costam gracillimis. Flores plures in racemum angustum elongatum dispositi. Perianthium infundibuliforme 10–15 lin. longum, segmentis 2½–3 lin. latis, apice solum falcatis. Stamina perianthio paulo breviora, antheris oblongis 1½ lin. longis. Ovarium 4 lin. longum, stylo recto duplo brevius, stigmate minimo. *California,* Walker, Bridges 268!

Var. 3. PARVIFLORUM, *Hook. Flor. Bor. Am.* ii. 281.—L. Sayii, *Nuttall, MSS.*—L. canadense, var. minus, *Wood, Proc. Acad. Phil.* 1868, 166. Caulis 2–3-pedalis. Folia verticillata vel plurima sparsa oblanceolata tenera, inferiora 6–12 lin. lata. Flores 1 vel pauci umbellati cernui. Perianthium 18–21 lin. longum, segmentis oblanceolatis obtusiusculis e medio 3–4 lin. lato arcte reflexis. Stamina perianthio triente breviora, antheris 3 lin. longis. Ovarium 6 lin. longum stylo æquilongum. *Columbia britannica et Oregon,* Nuttall! Douglas! Lyall! &c. Bulbus *L. canadensis* cum perianthio magis revoluto *L. pardalini* et *superbi* sed minore.

26. L. PARDALINUM, *Kellogg, Proc. Calif. Acad.* ii. 12, *cum icone; Duchartre, Obs.* 97. Bulbi (annui vel biennes?) breviter rhizomatosi, squamis paucis laxis lanceolatis acutis. Caulis 3–4-pedalis teres viridis glaber. Folia sæpe in 3–4 verticillos 9–12-foliatos distantes prope medium caulis disposita, superiora pauca sparsa, oblanceolata nitide viridia 3–4 poll. longa acuta medio 9–12 lin. lata glabra tenera venis lateralibus immersis. Flores 3–6 in corymbum vel umbellam laxam disposita pedicellis elongatis apice cernuis. Perianthium 2–2½ poll. longum, splendide rubrum, fundo aurantiacum, segmentis lanceolatis obtusiusculis medio 6–9 lin. latis profunde revolutis dimidio inferiore cito aurantiaco punctis magnis purpureo-brunneis instructo, paullulum lamellato-papillosis foveola excavata marginibus glabris. Stamina perianthio triente breviora, antheris rubris 4–5 lin. longis. Stylus ovarium vix superans 12–14 lin. longus. Capsula oblonga apice umbicata angulis acutiusculis. *California,* W. Lobb 249! &c.

Var. 1. CALIFORNICUM, *hb. Lindley; Florist,* 1873, t. 33 (*sphalmate ad calcem tabulæ "Washingtonianum"*). Folia pauciora latiora minus regulariter verticillata. Flores 1–3 majores 3–4 poll. longi, segmentis obtusiusculis 9–12 lin. latis, ut in forma typicali dimidio superiore splendide coccineis, inferiore cite aurantiaco punctis magnis purpureo-brunneis. Filamenta et stylus 1½–2-pollicaria. *California,* Hartweg! (Exemplum originale in hb. Lindleyano nunc Cantabrigiensi vidi.)

Var. 2. PALLIDIFOLIUM, *Baker.*—L. puberulum *hort., Leichtlin, non Torrey.* Elatior, caule in hortis nostris 4–5-pedali viridi glabro, foliis 50–80 oblanceolatis glabris pallide viridibus, eis *pardalini* firmioribus, distincte 5–7-nervatis, superioribus sæpissime regulariter verticillatis, inferioribus ad basin, tempore florendi, sparsis. Flores, si plures, laxe racemosi vel umbellati, pedicellis elongatis apice cernuis. Perianthium 2–2½ poll. longum, segmentis acutioribus medio 5–6 lin. latis infra medium arcte reflexis, rubro faciei pallidiore quam in *pardalino* et magis cum luteo fundis commixto, punctis paucioribus minoribus. Stamina perianthio subtriente breviora. *California,* hort., Leichtlin!

Var. 3. BOURGÆI, *Baker,* ab *pallidifloro* differt, ex exemplis paucis visis, foliis angustioribus omnibus regulariter verticillatis distincte 3–5-nervatis, venis faciei inferioris ciliatis, punctis faciei segmentorum more *pardalini* numerosioribus majoribus. *Ad ripas lacus Winipeg,* Bourgeau! et in hortos anglicos nuperrime introducta.

27. L. SUPERBUM, *L. Sp.* 434; *Bot. Mag.* t. 936; *Red. Lil.* t. 103; *Bury, Hexand.* t. 36; *Kunth, Enum.* iv. 258; *Flore des Serres,* t. 1014–15. Bulbi magni cæspitosi globosi perennes squamis numerosis acutis arcte imbricatis rubro tinctis. Folia primordialia firma glauco-viridia. Caulis 4–6-pedalis robustus strictus purpureo tinctus. Folia sæpe in verticillos 3–4 8–10-foliatos disposita, pauca vel plurima

sparsa, anguste oblanceolata acuta firmula sordide viridia glabra distincte 3–5-nervata, inferiora 4–5 poll. longa medio 6–9 lin. lata. Flores sæpe 6–12, interdum 20–40, in paniculam deltoideam 9–12 poll. latam dispositi, pedicellis apice cernuis, inferioribus 3–5 poll. longis divaricatis. Perianthium 3–4 poll. longum, splendide rubro-aurantiacum, segmentis acutis lanceolatis medio 6–9 lin. latis profunde cite revolutis dimidio inferiore punctis vinosis conspicuis decoratis paullulum lamellatis, foveola impressa marginibus glabris præditis. Filamenta 2–2½-pollicaria, valde divergentia, antheris rubellis 6–9 lin. longis. Ovarium 9–12 lin. longum, stylo declinato paulo brevius. Capsula obovoidea obtuse 6-angulata. *A Canada ad Georgiam et Carolinam in sylvis et locis uliginosis.*

Var. L. CAROLINIANUM, *Michx, Flora,* i. 197; *Bot. Mag.* t. 2280; *Bot. Reg.* t. 580; *Kunth, Enum.* iv. 258.—L. Michauxii, *Poir. Ency.* iii. 457.—L. Michauxianum, *Schult. fil. Syst.* vii. 258.—L. autumnale, *Lodd. Bot. Cab.* t. 355. Bulbus omnino formæ typicalis. Folia primordialia præcociora nitide viridia crassiora. Folia multo pauciora latiora breviora sæpe 5–6 prope medium caulis in verticillum disposita, reliqua sparsa. Caulis 1–2-pedalis mono- vel oligocephalus. Perianthium omnino formæ typicalis, sed segmenta interdum latiora obtusiora. *A Virginia et Carolina ad Floridam,* mense Augusto in hortis nostris florens, cum serotinis.

28. L. ROEZLEI, *Regel, Gartenfl.* t. 667.—L. canadense, var. Hartwegii, *Baker, Gard. Chron.* 1871, 321. Bulbus perennis rhizomatosus. Caulis 2–3-pedalis gracilis glaber. Folia in exemplis visis 20–30, pauca superiora vel inferiora verticillata vel omnia sparsa ascendentia firma glabra anguste linearia acuta obscure 3–5-nervata, inferiora 4–5 poll. longa medio 3–4 lin. lata. Flores 1–10, si plures corymbosi vel umbellati, pedicellis elongatis apice cernuis. Perianthium 2–3 poll. longum, splendide rubro-aurantiacum, segmentis acuminatis medio 5–6 lin. latis dimidio inferiore luteo punctis purpureis pluribus decoratis, supra basin arcte reflexis, foveola distincta marginibus glabris præditis. Stamina perianthio triente breviora, antheris 5–6 lin. longis. Stylus declinatus ovarium duplo superans. Capsulam ignoro. *Montes Scopulosi in ditione Utah*; Roezl in hortos europæos introduxit. *California ad montes Santa Cruz,* Hartweg 2003! Ab affinibus facile distinguitur foliis et perianthii segmentis angustis acutis.

29. L. COLUMBIANUM, *Hanson in hort., Leichtlin.* Bulbus ovoideus perennis parvus albus acutus, squamis lanceolatis. Caulis 1½–2-pedalis gracilis viridis glaber. Folia pauca inferiora in verticillos 4–5-foliatos disposita, superiora sparsa oblanceolata acuta 1½–2 poll. longa medio 5–6 lin. lata. Flores 2–3 umbellati pedicellis gracilibus 2–4 poll. longis apice cernuis foliis reductis basi bracteatis interdum bracteolatis. Perianthium 1½–2 poll. longum, splendide rubro-aurantiacum,

segmentis lanceolatis e medio 4–6 lin. lato arcte reflexis, facie crebre purpureo punctatis, foveola glabra leviter excavata. Stamina perianthio triente breviora, antheris 3–4 lin. longis. Stylus ovarium vix superans. *Oregon*, W. Lobb 350! hort., Leichtlin. A *canadensi*, var. *parvifloro*, vix differt nisi bulbo haud rhizomatoso.

30. L. Humboldtii, *Roezl & Leicht.*, *Duchartre, Obs.* 105; *Regel, Gartenf.* t. 724; *Flore des Serres*, t. 1973–4.—L. Bloomerianum, *Kellogg, Proc. Calif. Acad.* iv. (1871) 60.—L. Robinsonianum, *hort.*, *Ang.* Bulbus magnus 2–4 poll. crassus obliquus perennis haud rhizomatosus squamis paucis ovato-lanceolatis acutis 2–3 poll. longis. Caulis teres robustus 4–5-pedalis glaber vel puberulus viridis rubello maculatus. Folia sæpissime regulariter verticillata, in verticillos 4–6 10–15-foliatos disposita, oblanceolata, inferiora 4–5 poll. longa, supra medium 9–12 lin. lata acuta firma, saturate viridia undulata venis lateralibus distinctis, ad faciem inferiorem interdum ciliatis. Flores sæpe 6–10 interdum 30–40 in paniculam deltoideam expansam pedem latam dispositis, pedicellis divaricatis apice cernuis inferioribus 3–5 poll. longis, foliis oblanceolatis valde reductis bracteatis. Perianthium 3–4 poll. longum, splendide rubro-aurantiacum, extus basi viridescens, segmentis acutis medio 9–12 lin. latis supra basin arcte reflexis, ad faciem punctis vinoso-purpureis magnis copiosis decoratis, prope basin leviter papilloso-lamellatis, foveola distincte excavata marginibus glabris. Filamenta 1½–2-pollicaria, antheris rubris 6–8 lin. longis. Stylus 6–7 lin. longus ovario subtriplo brevior. Capsula magna obovoidea, more *Martagonis* acute 6-angulata. *California ad montes Sierra Nevada*, Roezl, in hort. Leichtlin.—L. canadense, var. puberulum, *Torrey, Bot. Whipple*, 90 (Hartweg 2004!), est forma hujus speciei caule et foliis subtus puberulis. Var. ocellatum, *Kellogg, Proc. Calif. Acad.* v. 88, t. 4, ex insula Santa Rosa, est forma perianthio luteo punctis faciei purpureis conspicuis.

31. L. Martagon, *L. Sp.* 435; *Jacq. Austr.* t. 351; *Bot. Mag.* t. 893 and 1634; *Red. Lil.* t. 146; *Eng. Bot.* t. 279, edit. 3, t. 1518; *Reich. Ic. Germ.* t. 451. Bulbus ovoideus 1½–2-pollicaris flavescens perennis squamis permultis angustis. Caulis 3–6-pedalis teres glaber vel sursum puberulus viridis vel purpureo-maculatus. Folia pleraque in verticillos 2–4 6–9-foliatos disposita, superiora vel raro omnia sparsa, horizontalia oblanceolata spathulata sessilia tenera, inferiora 4–6 poll. longa, supra medium 12–15 lin. lata tenera venis distinctis utrinque costam 3–5 distantibus glabra vel pubescentia, internodiis centralibus 6–9 poll. longis. Racemus laxus elongatus 3–20-florus, bracteis parvis, pedicellis floriferis cernuis, infimis 1–3 poll. longis. Perianthium suaveolens vinoso-purpureum 15–18 lin. longum, extus dorso pubescens, segmentis lanceolatis valde revolutis intus punctis copiosis livide purpureis decoratis unguibus leviter lamellatis foveola profunde exca-

vata margine papillosa, apice cucullatis crassis puberulis. Filamenta 8–10 lin. longa, antheras duplo excedentia, polline rubro. Ovarium 5–6-lineare, stylo valde declinato sesqui brevius. Capsula turbinata acute angulata apice umbilicata. *Europa centralis et meridionalis ad Siberiam et Japoniam ad finem Junii et initium Julii in hortis nostris florens.* De formis vide Parkinson, Parad. 31.—L. hirsutum, *Miller, Dict. No.* 10 (L. Milleri, *Schultes, Obs.* 67) est forma robusta caule puberulo.—L. glabrum, *Spreng. Syst.* ii. 62, est forma floribus albis caule glabro foliis nitide viridibus, polline luteo. Etiam adsunt formæ floribus vinosis impunctatis et carneis.

Var. L. CATTANEÆ, *Visiani, Fl. Dalm. Suppl.* 32, t. 3. Segmenta perianthii crassissima omnium specierum, saturate nigro-vinoso-purpurea, punctis subobsoletis. *Dalmatia,* hort., Leichtlin.—L. MARTAGON DALMATICUM, *Maly,* est forma similis vel eadem.

32. L. AVENACEUM, *Fischer, Maxim. in Regel, Gartenfl.* 1865, 290, t. 485.—L. Martagon, *Led. Fl. Ross.* iv. 149, *ex parte.* Bulbus globosus parvus perennis squamis plurimis lanceolatis. Caulis glaber teres 1½–2-pedalis, foliis sæpissime 6–9 ad medium caulis disposita, pauca inter verticillum et racemum sparsa raro in verticillos 2 vel omnia sparsa, horizontalia oblanceolata 3–4 poll. longa supra medium 6–18 lin. lata glabra tenera textura et venatione eorum *L. Martagonis.* Flores pauci, interdum subumbellati, bracteis parvis, pedicellis apice cernuis infimis 2–3 poll. longis. Perianthium leviter odorum, 15–18 lin. longum, splendide rubro-flavum, segmentis lanceolatis medio 4–6 lin. latis apice cucullatis, intus punctis minutis decoratis, foveola glabra profunde excavata. Filamenta 9–12 lin. longa, antheris 3–4 lin. longis. Ovarium 4–5 lin. longum, stylo declinato duplo brevius. *Kamtchatka, Manchuria, insulæ Kurilenses, Japonia.* Pallas! Maximowicz! &c. Habitus et folia *L. Martagonis,* cum perianthio rubro-flavo *L. canadensis.*

33. L. HANSONI, *Leicht.* Bulbus ei *tigrini* similis globosus perennis compactus albidus. Caulis 3–4-pedalis gracilis glaber teres robustus viridis. Folia oblanceolata acuta viridia tenera glabra nervis lateralibus 3 obliquis teneris distantibus, sæpissime 8–12 in verticillum unicum ad medium caulis aggregata patentia sessilia, reliqua sparsa, 4–5 poll. longa, supra medium 8–12 lin. lata, e medio ad basin sensim angustata. Flores 4–10 in racemum laxum dispositi, vel in umbellam congesti, pedicellis erecto-patentibus 1½–2 poll. longis, bracteis parvis ovato-lanceolatis. Perianthium 15–18 lin. longum splendide rubello-aurantiacum, segmentis crassis lanceolatis medio 4–5 lin. latis profunde falcato-revolutis, faciei dimidio inferiore purpureo-punctatis, foveola longa glabra profunde excavata præditis. Filamenta 10–12 lin. longa lutea, antheris angustis 4–5 lin. longis, polline flavo. Ovarium clavatum profunde sulcatum 5–6 lin. longum stylo paulo brevius.

Japonia, hort., Leichtlin! inter primas vegetans et florens. Inter *Martagon* et *canadensem* medium tenens.

34. L. MONADELPHUM, *M. Bieb. Fl. Taur.* i. 267; *Cent. Pl. Ross.* t. 4; *Gawl. Bot. Mag.* t. 1405; *Kunth, Enum.* iv. 260; *Fisch. & Lall. Ind. Sem. Petrop.* 1839, 57; *Reich. Exot.* t. 89; *Regel, Gartenf.* t. 733. —L. Loddigesianum, *Schultes, fil. Syst. Veg.* vii. 416; *Kunth, Enum.* iv. 261; *Lemaire, Jard. Fleur.* t. 204; *Paxt. Flow. Gard.* t. 58.—L. Szovitsianum, *Fisch. & Lall. Ind. Sem. Petr.* 1839, 58; *Kunth, Enum.* iv. 674; *Regel, Gart.* t. 436; *Flore des Serres*, 507–9.—L. colchicum, *Steven.* Bulbus ovoideus albidus perennis squamis pluribus lanceolatis. Caulis 2–5-pedalis robustus viridis puberulus. Folia 30–50 sparsa ascendentia lineari-lanceolata vel oblanceolata viridia distincte multinervata, centralia 3–4 poll. longa, medio 6–12 lin. lata, dorso et margine pubescentia. Racemus sæpissime 2–16 interdum 20–30-florus, pedunculis $1\frac{1}{2}$–2 poll. longis apice cernuis bracteis magnis geminatis lanceolatis. Perianthium suaveolens sulphureum $2\frac{1}{2}$–$3\frac{1}{2}$ poll. longum, segmentis oblanceolatis supra medium falcatis 9–12 lin. latis basi et apice purpureo tinctis facie punctis minutis nigrescentibus paucis decoratis nullo modo papillosis, foveola glabra leviter impressa præditis. Filamenta 18–21 lin. longa viridia applanata e basi ad basin trientis superioris valvata, antheris 5–6 lin. longis polline rubro. Ovarium 7–8 lin. longum, stylo subrecto duplo brevius. Capsula obovoidea 18–21 lin. longa obtuse angulata apice umbilicata. *Caucasus et Persia borealis, in hortis nostris mense Junio cum prioribus florens.* Planta originalis Biebersteinii est forma mera filamentis deorsum coalitis. Ab speciebus reliquis hujus stirpis ad § Eulirion, forma perianthii, defectu papillorum &c. recedit.

Var. β. L. LEDEBOURII, *Baker.*—L. pyrenaicum, *Led. Fl. Ross.* iv. 151, *non Gouan.* Humilior, foliis angustioribus 80–100 linearibus 7-nervatis medio 4–6 lin. latis subtus vix pubescentibus. Segmenta perianthii 6–8 lin. lata. *Caucasus*, Güldenstædt, C. A. Meyer (*v. v. in hort. Kew.*).

35. L. POLYPHYLLUM, *D. Don in Royle, Ill. Him.* 388; *Kunth, Enum.* iv. 677; *Klotzsch, Reise Wald.* 53.—L. punctatum, *Jacquem.*, *Duchartre, Obs.* 76. Caulis glaber teres 3–4-pedalis. Folia 40–60 ascendentia sparsa (vel inferiora interdum verticillata teste Jacquemont) viridia sessilia acuta glabra margine minute papillosa, textura et venatione eorum *L. Martagonis*, inferiora oblanceolata 4–5 poll. longa supra medium 6–9 lin. lata, superiora angustiora linearia. Pedunculus infra racemum 5–6-poll. nudus. Racemus laxus 4–10-florus, ramis sæpe oppositis, bracteis verticillatis, pedicellis floriferis apice cernuis, inferioribus 3–5 poll. longis. Perianthium 18–21 lin. longum, suaveolens, "livide flavescens, punctis vinoso-purpureis" (Jacquemont) segmentis oblanceolatis 2–3 lin. latis e medio revolutis.

Filamenta 15–16 lin. longa, antheris 4 lin. longis. Ovarium 6–7 lin. longum, stylo valde declinato sesqui brevius. Capsula obovoidea, 12–15 lin. longa subacute angulata. *Regio temperata Himalayæ occidentalis* (*Kunawar, Kashmir, &c.*), Royle, Thomson! Jacquemont!

36. L. PONTICUM, *K. Koch, Linnæa*, xxii. 234; *Duchartre, Obs.* 22. Bulbus ovoideus pollicaris perennis squamis pluribus lanceolatis. Caulis 1½–2-pedalis gracilis sursum puberulus. Folia 20–30 sparsa lanceolata firma ascendentia 15–18 lin. longa 4–5 lin. lata, superiora angustiora, venis pluribus distinctis, facie inferiore et margine pubescentia. Flores 1–6 cernui 18–21 lin. longi flavi, segmentis oblanceolatis infra medium reflexis medio 3–4 lin. latis vix punctatis foveolis leviter impressis. Filamenta perianthio duplo breviora antheris 3–4 lin. longis. Ovarium 6 lin. longum, stylo clavato paulo brevius. Capsula 1 poll. longa obovoidea obtuse angulata. *Montes Armeniæ* alt. 6000–7000 pedes, K. Koch; *Lazistan, regio montana*, Balansa, Plantes de l'Orient, anno 1866, no. 1531! Folia et habitus *L. monadelphi* sed gracilior, perianthio typicali magis revoluto hujus stirpis. Tabula Regeliana (Gartenflora, t. 436) a K. Kochio ad *ponticum* adscripta, est sensu nostro *Szovitsianum* verum. Exemplum angustifolium adest in herbario Candollei, ex Lazistan, foliis confertioribus inferioribus 3 poll. longis 3–4 lin. latis ad varietatem *monadelphi* respondens.

37. L. CARNIOLICUM, *Bernh. in Mert. & Koch, Deutsch. Flora*, ii. 536; *Kunth, Enum.* iv. 260; *Reich. Ic. Flor. Germ.* t. 990; *Parl. Fl. Ital.* ii. 404.—L. chalcedonicum, *Linn. Sp. Plant.* 434 *ex parte*; *Jacq. Fl. Austr. Suppl.* t. 20. Martagon pannonicum sive exoticum flore spadiceo, *Parkins. Parad.* 35. Bulbus perennis ovoideus squamis pluribus lanceolatis. Caulis 2–3-pedalis viridis puberulus. Folia 30–40 sparsa ascendentia lanceolata vel lineari-lanceolata, inferiora 2–3 poll. longa medio 6–9 lin. lata plana distincte multinervata, marginibus et venis faciei inferioris distincte ciliatis, superiora breviora ad pedunculum adpressa. Racemus pauciflorus, pedicellis 2–3 poll. longis apice cernuis interdum bracteolatis. Perianthium 1½–2 poll. longum, splendide luteum vel miniatum, segmentis oblanceolatis arcte revolutis medio 5–6 lin. latis, facie punctis pluribus minutis decoratis, deorsum papillosis, foveolis distincte excavatis. Filamenta 8–12 lin. longa, antheris 5–6 lin. longis, polline croceo. Ovarium 5–6 lin. longum, stylo clavato æquilongum. Capsula 1½ poll. longa obtuse angulata. *Lombardia, Istria, Dalmatia, Illyria, Austria. Bosnia mense Junio florens.*

38. L. TESTACEUM, *Lindl. Bot. Reg.* 1842, *Misc.* 51; 1843, t. 11; *Paxt. Mag. Bot.* 1843, 221, *cum icone*; *Kunth, Enum.* iv. 673; *Flore*

des Serres, t. 39; *Regel, Gartenfl.* t. 349.—L. excelsum, *Walp. Ann.* vi. 110.—L. isabellinum, *Kunze in Mohl & Schlecht. Bot. Zeit.* i. 609. Bulbus globosus perennis. Caulis 4–5-pedalis sulcatus leviter puberulus brunneo tinctus. Folia 60–100 sparsa conferta linearia ascendentia, firma obscure viridia 3–5-nervata, inferiora 3–4 poll. longa medio 3–4 lin. lata marginibus albido-puberulis superioribus sensim minoribus 1–1½ poll. longis ad caulem adpressis marginibus albis magis distinctis ab floribus remotis. Flores 3–10 umbellati vel racemosi, suaveolentes pedicellis erecto-patentibus 4–6 poll. longis apice cernuis, foliis reductis albo marginatis bracteatis. Perianthium 2½–3 poll. longum, obscure luteum, segmentis profunde revolutis 9–12 lin. latis prope basin punctis paucis minutis rubellis decoratis, leviter papilloso-lamellatis, foveola excavata marginibus glabris instructis. Filamenta perianthio duplo breviora, antheris 5–6 lin. longis polline rubro. Ovarium 6–8 lin. longum stylo declinato subduplo brevius. *Stirps hortensis, ad finem Julii florens, verisimiliter inter* candidum *et* chalcedonicum *hybrida.*

39. L. LEICHTLINII, *Hook. fil. Bot. Mag.* t. 5673; *Ill. Hort.* t. 540; *Flore des Serres*, t. 1736; *Belg. Hort.* 1869, t. 11; *Floral Mag.* t. 509. Bulbus parvus perennis globosus squamis paucis latis acutis crassis arcte imbricatis. Caulis 2–3-pedalis atro-brunneus gracilis obscure puberulus basi repens. Folia 30–40 sparsa linearia ascendentia saturate viridia firma plana distincte trinervata, inferiora 3–5 poll. longa 3–4 lin. lata, suprema lanceolata, ab floribus remota. Flores pauci laxe corymbosi pedicellis erecto-patentibus 3–4 poll. longis apice cernuis. Perianthium inodorum 2½–3 poll. longum splendide citrinum extus purpureo tinctum intus punctis vinosis conspicuis e basi supra medium sparsum, segmentis lanceolatis medio 6–9 lin. latis, profunde revolutis, apice callosis canaliculatis, prope basin leviter lamellatis, foveola excavata marginibus obscure pubescentibus instructis. Filamenta flava, 2–2¼-pollicaria, late divergentia, antheris rubro-brunneis 6–7 lin. longis. Ovarium gracile 9 lin. longum, stylo declinato triplo brevius. *Japonia*, Maximowicz! in hortis nostris ad finem Julii cum *tigrino* florens.

Var. MAJUS, *Wils. in Journ. Hort.* 1873, 371, cum icone, est forma luxurians 5-pedalis foliis 6–7 poll. longis.—L. MAXIMOWICZII, *Regel, Ind. Sem. Hort. Petr.* 1866, 26; *Gart.* 1868, 322, t. 596; *Animad.* 1873, 20, est varietas floribus splendide puniceis. *Japonia*, Maximowicz!

40. L. PSEUDO-TIGRINUM, *Carrière, Revue Hort.* 1867, 410, *cum icone*; *Regel, Gart.* 1868, 118; *Animad.* 1873, 21. Bulbus ovoideus perennis squamis acutis adpressis modice crassis. Caulis 3–4-pedalis basi erectus albido-puberulus luride viridis teres obscure maculatus. Folia sparsa linearia 4–5 poll. longa 3–4 lin. lata recurvato-patentia

margine revoluta initio margine et basi extus albido-araneosa. Racemus laxus 4–6-florus, pedicellis erecto-patentibus 2–3 poll. longis apice cernuis, bracteis et bracteolis linearibus. Perianthium 2–2½ poll. longum, splendide puniceum, intus punctis copiosis nigro-brunneis decoratum, segmentis ovato-lanceolatis supra basin 8–12 lin. latis valde revolutis copiose papilloso-lamellatis foveola excavata instructis. Filamenta 2-pollicaria coccinea, antheris 6–7 lin. longis polline rubro. Stylus coccineus 1½-pollicaris valde declinatus, ovarium duplo superans. *China, ad initium Julii in hortis nostris florens.*

41. L. POMPONIUM, *L. Sp.* 434; *Bot. Mag.* t. 971; *Kunth, Enum.* iv. 266; *Reich. Ic. Germ.* t. 991; *Gren. Fl. France,* iii. 181.—L. rubrum, *Lam. et DC. Gall.* iii. 213. Bulbus ovoideus perennis squamis pluribus lanceolatis. Caulis 2–3-pedalis crassus strictus sulcatus. Folia 100 vel plura saturate viridia sparsa anguste linearia ascendentia, inferiora 2–4 poll. longa, 1½–2 lin. lata, trinervata marginibus papillosis leviter revolutis, infima 3–4 lin. lata, superiora breviora anguste linearia. Pedunculus 2–3 poll. infra racemum nudus. Racemus 2–15-florus, pedunculis apice cernuis sæpe bracteolatis. Perianthium odorum 1½–2 poll. longum, sæpissime miniatum, intus copiose papillosum et nigro-punctatum, segmentis arcte revolutis oblanceolatis 3–4 lin. latis, foveola glabra distincte excavata, marginibus glabris. Filamenta viridia 12–14 lin. longa, antheris 3–4 lin. longis, polline miniato. Ovarium 5–6 lin. longum stylo paulo brevius. Capsula obovoidea 1½ poll. longa apice umbilicata subacute 6-angulata. *Italia borealis et Gallia meridionalis, ad finem Junii in hortis nostris florens.* L. ANGUSTIFOLIUM, *Mill. Dict.* No. 6, est forma gracilior foliis angustissimis uninervatis.

Var. L. PYRENAICUM, *Gouan, Ill.* 25; *Red. Lil.* t. 145; *Reich. Ic. Germ.* t. 992; *Kunth, Enum.* iv. 262.—L. flavum, *Lam. Gall.* iii. 283. Robustior, foliis paulo latioribus distincte trinervatis sæpe ad basin racemi productis, floribus flavis majoribus bracteis majoribus stylo crassiore. *Regio montana Pyrenaica.*—MARTAGON LUTEUM NON PUNCTATUM, *Parkins, Theat.* 35, est forma floribus flavis impunctatis.

42. L. CHALCEDONICUM, *Linn. Sp. Plant.* 434, *ex parte*; *Gawl. Bot. Mag.* t. 30; *Red. Lil.* t. 276; *Kunth, Enum.* iv. 262; *Reich. Ic. Germ.* t. 993. *non Jacq.*—L. rubrum byzantinum sive Martagon constantinopolitanum, *Parkins, Parad.* 34. Bulbus ovoideus perennis flavescens squamis pluribus lanceolatis. Caulis strictus puberulus 3–4-pedalis viridis purpureo tinctus. Folia 100 vel plura ascendentia conferta sessilia pallide viridia, infima oblanceolata, centralia linearia 2–3 poll. longa, 2–3 lin. lata, 3–5-nervata, marginibus et venis faciei inferioris distincte albo-papillosis, superiora minora ad pedunculum adpressa. Racemus pauciflorus pedunculis apice cernuis sæpe bracte-

olatis. Perianthium inodorum 1½–2 poll. longum, sæpissime splendide miniatum impunctatum, interdum punctis minutis intus decoratum, raro flavum, segmentis oblanceolatis arcte revolutis medio 5–6 lin. latis, papillis copiosis, foveola distincte impressa marginibus glabris. Filamenta 12–14 lin. longa, antheris 4–4½ lin. longis, polline miniato. Ovarium 5–6 lin. longum, stylo subæquilongum vel paulo brevius. Capsula obtuse angulata. *Græcia et insulæ Ionicæ, in hortis nostris ad finem Julii et initium Augusti inter serotinos florens.*—L. ALBANICUM, *Griseb. Fl. Rumel.* ii. 385; *Schur. Transyl.* 662.—L. pyrenaicum, *Baumg. Transyl.* 632, *non Gouan,* ex montibus Albaniæ et Transylvaniæ, est forma sylvestris montana floribus flavis sæpissime solitariis.—L. GRACILE, *Ebel, Zwölf Tage auf Montenegro,* 8, t. 1, flore ignoto, ex montibus Montenegro, non vidi.

43. L. CALLOSUM, *Sieb. et Zucc. Fl. Jap.* ix. 86, t. 41; *Kunth, Enum.* iv. 262; *Miquel, Ann. Mus. Lug. Bat.* iii. 156.—L. pomponium, *Thunb. Fl. Jap.* 134, *non Linn.* Bulbus parvus perennis squamis paucis lanceolatis. Caulis 1½–3-pedalis gracilis teres glaber. Folia 30–40 sparsa linearia ascendentia glabra firma viridia 3–5-nervata marginibus anguste revolutis inferiora 3–4 poll. longa medio 1–2 lin. lata, superiora sensim minora. Racemus angustus laxus 2–12-florus pedicellis brevibus cernuis, bracteis geminatis ligulatis crassis 4–9 lin. longis apice obtusis callosis. Perianthium semper splendide coccineum, 12–18 lin. longum, segmentis oblanceolato-spathulatis 2½–3 lin. latis apice cucullatis, facie nullo modo punctatis, foveola glabra profunde excavata marginibus glabris. Filamenta perianthio triente breviora, antheris coccineis 3–4 lin. longis. Ovarium 5–6 lin. longum, stylo clavato leviter declinato æquilongum. Capsula obovoidea 15–18 lin. longa obtuse angulata. *Japonia et insulæ Loo-choo,* Maximowicz! Oldham, 872! Buerger! &c.

44. L. TENUIFOLIUM, *Fisch. Ind. Sem. Hort. Gorenk.* 1812, 8; *Schultes, fil. Syst. Veg.* vii. 409; *Kunth, Enum.* iv. 263.—L. pumilum, *DC. in Red. Lil.* t. 378; *Kunth, Enum.* iv. 263.—L. linifolium, *Hornem. Hort. Hafn.* i. 326.—L. puniceum, *Sieb. et De Vriese, Ann. Hort. Pays-Bas,* 1861, 23. Bulbus parvus globosus annuus? squamis pluribus lanceolatis. Caulis 1–2-pedalis gracillimus teres glaber. Folia 30–50 angustissima sparsa ascendentia, centralia 1½–2 poll. longa ½–1 lin. lata 1-nervata marginibus revolutis. Pedunculus 2–3-poll. infra racemum nudus. Racemus laxus 1–20-florus. Pedicelli 2–3 poll. longi apice cernui bracteis lineari-subulatis geminatis. Perianthium 15–18 lin. longum, splendide pallide coccineum segmentis oblanceolatis medio 3–4 lin. latis valde revolutis facie sæpissime concoloribus raro punctis paucis minutis nigrescentibus decoratis foveola glabra distincte impressa præditis. Filamenta pallide rubra 8–9 lin. longa, antheris duplo longiora, polline coccineo. Ovarium 4–4½ lin.

longum, stylo gracili sesqui brevius. *Siberia a montibus Altai ad Amurland et Chinam borealem*, Pallas! Maximowicz! &c.

Var. L. STENOPHYLLUM, *Baker*.—L. pumilum *hort.*, *Leichtlin*, *non DC.* Bulbus magis ovoideus squamis paucioribus latioribus. Caulis robustior elatior, foliis distantibus 1½–2 lin. latis trinervatis. Perianthium 18–21 lin. longum, tubo duplo longiore et magis cylindrico quam in typo, segmentis angustioribus magis ligulatis. *Siberia orientalis* hort., Leichtlin.

Species dubiæ.

45. L. NANUM, *Klotsch. Reise Wald.* 53. Semipedale, "puberulum usque ad basin foliorum, uniflorum; foliis linearibus gramineis obtusiusculis strictis erectis 5-nerviis; flore cernuo parvo campanulato candido; perigonii foliolis oblongis obtusis, omnibus sessilibus; stigmate incrassato trigono puberulo; filamentis subulatis; antheris oblongis obtusis basi obtuso-bifidis." *Himalaya occidentalis*, Hoffmeister.

46. L. LANCIFOLIUM, *Thunb. Linn. Trans.* ii. 333; *Mem. Acad. Petrop.* iii. 202, t. 3; *Kunth, Enum.* iv. 266.—L. bulbiferum, *Thunb. Jap.* 134. Habitus et folia *L. elegantis*. Caulis angulatus hirsutus erectus simplex pedalis et ultra. Folia sparsa subdistantia ascendentia, inferiora linearia sensim acuminata 3–4 poll. longa infra medium 5–6 lin. lata, superiora sensim breviora lanceolata in axillis bulbillifera. Flores erecti in exemplo solo 2, pedicellis brevissimis foliis ovatis reductis bracteatis. "Corollæ" (an plene evolutæ dubito) "parvæ unguiculares albæ." *Japonia*, Thunberg. Ex notis Thunbergianis et tabula ab Prof. Areschoug benevole communicata descripta. Verisimiliter forma imperfecte evoluta *L. elegantis*.

2. FRITILLARIA, *Linn.*

Gen. No. 411; *Endl. Gen.* No. 1096; *Kunth, Enum.* iv. 246.—Petilium, *Linn. Hort. Cliff.* 119; *Kunth, Enum.* iv. 245.—Imperialis, *Moench, Meth.* 395.—Amblirion, *Rafin. Journ. Phys.* 89. 102; *Bernh. Bot. Zeit.* 1835, 595.—Theresia, *K. Koch, Linn.* xxii. 232.—Rhinopetalum, *Fisch. Edin. New Phil. Journ.* 1830, 19; *Endl. Gen.* No. 1097.—Sarana, *Fisch. MSS.*—Liliorhiza, *Kellogg, Proc. Calif. Acad.* 2. 46, t. 1.—Monocodon et Lyperia, *Salisb. Gen.* 56.—Eucrinum, *Nuttall, Journ. Acad. Phil.* vii. 54.—Tozzettia, *Parl. Nuov. Gen.* 11.—Korolkowia, *Regel, Animad.* (1873) 17.—Notholirion, *Wallich, MSS.*

Perianthium 6-partitum corollinum sæpe saturate vinoso-purpu-

reum plus minusve viridulo vel albido tessellatum vel suffusum, segmentis oblanceolato-oblongis obtusiusculis vel obtusis diutine imbricatis dimidio inferiore vel supra basin faciei nectario glanduloso glabro foveolatis. *Stamina* 6, segmentis sæpissime breviora, antheris oblongis prope basin affixis leviter versatilibus longitudinaliter dehiscentibus, filamentis filiformibus leviter perigynis deorsum paulo applanatis. *Ovarium* subsessile 3-loculare, ovulis in loculo crebris horizontalibus ; stylus filiformis elongatus, sæpissime apice stigmatoso tricuspidatus, interdum indivisus. *Capsula* obovoidea breviter stipitata membranacea obtuse vel acute 6-angulata seminibus discoideis dimidiato-obovatis testa tenui brunnea.—*Herbæ bulbosæ, bulbis membranaceo-tunicatis vel squamis crassis cinctis, foliis linearibus vel lanceolatis sæpissime paucis, infimis vel supremis sæpe verticillatis, floribus magnis sæpissime vinoso-purpureis solitariis vel paucis vernalibus, nunquam splendide flavis vel rubris, raro pluribus racemosis vel umbellatis.*

Subgenus I. Eufritillaria. *Bulbus tunicatus. Stylus tricuspidatus. Foveolæ æquales distinctæ elongatæ.*

Foveola 5–6-linearis. Stigmata stylo subduplo breviora. 1. *Meleagris.*

Foveola 3–4-linearis. Stigmata brevissima ...... 2. *delphinensis.*

Subgenus II. Monocodon. *Bulbus tunicatus. Stylus tricuspidatus. Foveolæ æquales distinctæ latæ.*

Folia suprema sæpissime opposita vel verticillata.

Elatæ, foliis anguste linearibus apice nunquam cirrosis.

3. *tenella.* 4. *pontica.* 5. *messanensis.* 6. *Reuteri.* 7. *involucrata.* 8. *Roylei.*

Elatæ, foliis superioribus apice cirrosis.

9. *cirrosa.* 10. *verticillata.* 11. *ruthenica.*

Humiliores, foliis latis. 12. *lutea.* 13. *pallidiflora.*

Elatæ, foliis omnibus sparsis anguste linearibus.

14. *meleagroides.* 15. *lusitanica.* 16. *pyrenaica.* 17. *Olivieri.* 18. *acmopetala.* 19. *Kotschyana.*

Humiliores, foliis latis omnibus sparsis.

20. *græca.* 21. *tristis.* 22. *conica.* 23. *Guicciardii.* 24. *Hermontis.* 25. *crassifolia.* 26. *kurdica.*

Subgenus III. Amblirion. *Bulbus tunicatus. Stylus indivisus. Foveolæ obscuræ æquales.*

Stamina perianthio subduplo breviora.

27. *bithynica.* 28. *Forbesii.* 29. *Gardneriana.*

Stamina perianthio triente breviora.

30. *Pinardi.* 31. *assyriaca.* 32. *Ehrharti.*

Stamina perianthio paulo breviora.

33. *Fleischeri.* 34. *tulipifolia.* 35. *pudica.*

Subgenus IV. Korolkowia. *Bulbus tunicatus stoloniferus. Stylus indivisus. Foveolæ elongatæ inæquales.*

Species sola .... 36. *Sewerzowi.*

Subgenus V. Rhinopetalum. *Bulbus tunicatus. Stylus indivisus. Foveolæ profundæ breves inæquales.*

Species sola .... 37. *Karelini.*

Subgenus VI. Notholirion. *Bulbus tunicatus. Stylus tricuspidatus. Foveolæ æquales obscuræ elongatæ.*

38. *macrophylla.* 39. *Hookeri.*

Subgenus VII. Theresia. *Bulbus squamosus. Stylus indivisus.*

Orientales .... 40. *persica.* 41. *libanotica.*

Americana .... 42. *pluriflora.*

Subgenus VIII. Goniocarpa. *Bulbus squamosus. Stylus tricuspidatus. Capsula acute angulata. Flores solitarii vel racemosi.*

Asiatica .... 43. *dagana.*

Americanæ.

44. *alba.* 45. *lanceolata.* 46. *parviflora.* 47. *atropurpurea.*

Subgenus IX. Liliorhiza. *Bulbus squamosus. Stylus tricuspidatus. Capsula obtuse angulata.*

Stamina perianthio paulo breviora .... 48. *recurva.*

Stamina perianthio duplo breviora.

49. *liliacea.* 50. *biflora.* 51. *kamtchatcensis.*

Subgenus X. Petilium. *Bulbus squamosus. Stylus tricuspidatus. Capsula acute angulata. Flores umbellati.*

Species sola.. 52. *imperialis.*

Subgenus I. EUFRITILLARIA, *Baker*. Bulbus membranaceo-tunicatus. Caulis sæpissime monocephalus. Stylus apice stigmatoso distincte tricuspidatus. Segmenta tessellata supra basin foveola lineari vel lanceolata instructa.—Fritillaria, *Salisb.*

1. F. MELEAGRIS, *L. Sp.* edit. i. 304 (excl. var.); *Engl. Bot.* t. 622; *Jacq. Austr. App.* t. 32; *Red. Lil.* t. 222; *Fl. Dan.* t. 972; *Kunth, Enum.* iv. 251; *Reich. Ic.* t. 974; *Morren, Belg. Hort.* t. 49. fig. 1; *Eng. Bot.* 3rd edit. t. 1519. Bulbus globosus 4–6 lin. crassus membranaceo-tunicatus. Caulis erectus 9–15-pollicaris brunneo-viridis sæpissime uniflorus. Folia 4–5 distantia supra medium caulis imposita linearia ascendentia subglauca canaliculata 3–6 poll. longa 1½–3 lin. lata. Perianthium cernuum inodorum 15–18 lin. longum vinoso-purpureum maculis albidis distincte tessellatum, venis saturate rubro-purpureis verticalibus utrinque costam 3, vel album venis viridibus, segmentis oblongis medio 6–9 lin. latis, interioribus latioribus basi spathulatis apice haud porrectis, omnibus 3–4 lin. supra basin sulco viridi lineari 5–6 lin. longo foveolatis. Antheræ lineares acutæ 3–4 lin. longæ filamentis sesqui breviores. Ovarium 4 lin. longum; stigmata 3 lin. longa, stylo subduplo breviora. Capsula globosa obtuse angulata 6–8 lin. longa et lata, collo distincto turbinato. *Ab Anglia et Norvegia per Europam centralem ad Caucasum et Bosniam.* Apud nos fine Aprilis floret. Formæ insigniores sunt F. MAJOR, *Bouché, Kunth, Enum.* v. 252, floribus majoribus segmentis magis patentibus; F. ALBA, *Parkins, Parad.* 41, t. 4, est forma albiflora; F. FLORE DUPLICI ALBICANTE, *Parkins, Parad.* 42, est forma floribus plenis albido-purpureis leviter tessellatis; F. PRÆCOX, *K. Koch, Walp. Ann.* vi. 105, hortensis, caule viridi, foliis 6–8 latioribus, floribus albis 2–3; BRACHYPODA, *Baker*, hortensis, perianthio expanso subinfundibuliformi, segmentis viridulo tessellatis, filamentis antheris triplo brevioribus; et FLAVIDA, *Baker*, segmentis flavidis maculis paucis rubro-purpureis tessellatis (fortasse inter *Melagridem* et *luteam* hybrida hortensis habitu et foliis prioris).

2. F. DELPHINENSIS, *Gren. Flor. France*, iii. 180; *Parl. Ital.* ii. 412; *Walp. Ann.* iv. 107.—F. tubæformis, *Gren. et Godr. Mem. Soc. Emul. Doubs, May*, 1854. Bulbus globosus membranaceo-tunicatus 4–6 lin. crassus. Caulis ½–1-pedalis sæpissime uniflorus. Folia 4–6, omnia supra medium caulis imposita, ascendentia plana 2–3-pollicaria, superiora linearia, inferiora oblanceolata interdum 3–4 lin. lata. Perianthium cernuum inodorum 15–21 lin. longum, vinoso-purpureum maculis flavidis sæpe obscuris tessellatum, venis pluribus saturatis utrinque costam, interdum albidum vel flavidum, segmentis oblongis obtusis rectis medio 6–9 lin. latis, interioribus latioribus, omnibus 3–4 lin. supra basin foveola lanceolata 3–4-lineari præditis. Antheræ flavæ 3 lin. longæ, filamentis vinosis sesqui breviores. Stylus 5–6

lin. longus apice solum leviter tricuspidatus. Capsula obovoideo-oblonga obtuse angulata 12–15 lin. longa. *Alpes Delphinatus et Sabaudiæ.*—F. LUTEA, *Reich. Ic.* t. 975, *non Miller*, est verisimiliter forma flaviflora hujus speciei.

Var. MOGGRIDGEI, *Boiss.* (*Moggridge, Cont. Ment.* t. 25), *Planch. Bull. Soc. France*, 1873, 116, est forma humilis latifolia (foliis interdum 6–9 lin. latis) flaviflora ex Alpibus Maritimis cuspidibus stigmatosis longioribus ad *F. luteam* accedens.

Var. BURNATI, *Planch. Bull. Soc. Bot. Frauce*, 1873, 115, *ex Alpibus maritimis ad Col. de Tende*, Bourgeau! &c., *Tirolensibus*, Huter! et *Corsica*, Dierck in hb. Moggridge! ad *F. tenellam* accedit perianthio minore late campanulato livide vinoso-purpureo et foveola minore.

Subgenus II. MONOCODON (*Salisb.*) *Bulbus* membranaceo-tunicatus. *Caulis* monocephalus vel oligocephalus. *Stylus* apice stigmatoso distincte tricuspidatus. *Segmenta* plus minusve distincte tessellata supra basin foveola oblonga vel ovata instructa.

3. F. TENELLA, *M. Bieb. Fl. Cauc.* i. 269; *Led. Ross.* iv. 146; *Reich. Germ.* 102; *Reich. Ic.* t. 977–9; *Belg. Hort.* t. 49. fig. 3.—F. montana, *Hoppe, Flora*, xv. 2, 476; *Koch, Syn.* edit. 1, 707; *Kunth, Enum.* iv. 249; *Parl. Fl. Ital.* ii. 410; *Mogg. Ment.* t. 66; *Belg. Hort.* t. 49. fig. 4.—F. racemosa *a.* minor, *Gawl. Bot. Mag.* t. 1216; *Kunth, Enum.* iv. 249.—F. caussolensis, *Goaty & Pons in Ardoino, Flor. Alp. Marit.* 375. Bulbus depresso-globosus 4–6 lin. crassus. Caulis 9–15-pollicaris, sæpissime uniflorus, foliis 5–8 supra medium caulis impositis anguste linearibus ascendentibus 2–3 poll. longis 1½–3 lin. latis supremis geminatis, ab reliquis omnibus sparsis vel infimis oppositis remotis. Perianthium cernuum inodorum 9–12 lin. longum, segmentis oblanceolato-oblongis rectis 4–6 lin. latis saturate vinoso-purpureis, præsertim intus maculis viridibus tessellatis venis pluribus crebris, prope basin nectario viridi rotundato foveolatis. Antheræ apiculatæ 2–3 lin. longæ filamentis sesqui vel duplo breviores. Ovarium 4 lin. longum; stylus 2 lin. longus cuspidibus stigmatosis subæquilongus. Capsula obovoidea 6–8 lin. longa, collo brevissimo. *In Alpibus maritimis, montibus Germaniæ littoralis, Austriæ et ditionis Caucasi.*—F. ORSINIANA, *Parl. Fl. Ital.* ii. 411, ex Apenninis centralibus dicitur differre habitu humiliore, floribus minoribus, perianthii segmentis apicem versus magis angustatis.—F. RACEMOSA, *Gawl. Bot. Mag.* t. 952, excl. syn. (F. Gawleri, *Jaub. & Spach, Ic.* t. 500), est verisimiliter forma hortensis floribus 3–6 racemosis, foliis 12–20, infimis lanceolatis 2–3-natis 5–6 poll. longis 9–12 lin. latis.

4. F. PONTICA, *Wahl. Isis*, xxi. 984; *Schult. Syst.* vii. 1687; *Kunth, Enum.* iv. 248; *Griseb. Rumel.* ii. 383.—F. olympica, *K. Koch, Linn.*

xxii. 232; *Walp. Ann.* iii. 628. Bulbus globosus membranaceo-tunicatus. Caulis 1–1½-pedalis sæpissime monocephalus, foliis 6–8 supra medium impositis infimis oppositis lanceolatis 2–3 poll. longis 3–4 lin. latis, centralibus sparsis, supremis ternis angustioribus acutioribus. Perianthium campanulatum 12–15 lin. longum vinoso-purpureum flavo-viridi suffusum vix tessellatum, segmentis rectis obtusis oblanceolato-oblongis 3–4 lin. latis supra basin nectario lato parvo foveolatis. Genitalia perianthio subduplo breviora. Antheræ obtusæ 2 lin. longæ, filamentis ciliatis duplo breviores. Ovarium cylindricum 3 lin. longum; stylus 2½–3 lin. longus, stigmata triplo superans. Capsula alata. *In sylvis Bithyniæ, Thraciæ, Macedoniæ,* 0–2500 pedes, Grisebach! Aucher-Eloy, 2183!

5. F. MESSANENSIS, *Rafin. Précis,* 44; *Guss. Prod.* i. 410; *Synops.* i. 400; *Kunth, Enum.* iv. 248, ex parte; *Parl. Fl. Ital.* ii. 413, ex parte, *non Boiss. Voy. Esp.* 611. Bulbus globosus 4–6 lin. crassus. Caulis 1–1½-pedalis, mono- raro 2-cephalus, foliis 8–10 ascendentibus linearibus, infimis sparsis infra medium caulis impositis 3–4 poll. longis 3–4 lin. latis, supremis 1–1½ lin. latis longe acuminatis sæpissime ternis. Perianthium cernuum 15–20 lin. longum, segmentis rectis oblanceolato-oblongis 5–6 lin. latis, exterioribus acutioribus extus vinoso-purpureis vix tessellatis dorso late viridi carinatis intus viridibus paulo supra basin foveola ovata instructis. Antheræ apiculatæ 3 lin. longæ filamentis sesqui breviores. Ovarium 4 lin. longum; stylus 3 lin. longus, stigmata vix excedens. Capsula obovoideo-globosa ad pollicem longa obtuse angulata collo distincto. *Sicilia in fruticetis montosis prope Messinam, Calabria,* &c., De Heldreich! Swainson! Tineo! Huet du Pavillon, 202! &c.

6. F. REUTERI, *Boiss. Diagn.* v. 57; *Walp. Ann.* 851. Bulbus membranaceo-tunicatus 3–4 lin. crassus. Caulis 6–9-pollicaris gracilis monocephalus, foliis 5–6, inferioribus linearibus 2–3 poll. longis medio 3–4 lin. latis, supremis multo minoribus ternis vel solitariis. Perianthium 7–9 lin. longum, segmentis vinoso-purpureis apice et intus flavido-viridibus oblongo-oblanceolatis obtusis 3–4 lin. latis longe supra basin obscure late foveolatis. Antheræ flavæ apiculatæ 2½ lin. longæ filamentis glabris sesqui breviores. Ovarium 2½ lin. longum; stylus 3 lin. longus, stigmata duplo superans. *Persia prope Ispahan,* Aucher Eloy, 5379!

7. F. INVOLUCRATA, *All. Auct.* 34; *Kunth, Enum.* iv. 249, *ex parte*; *Reich. Ic.* t. 980; *Parl. Fl. Ital.* ii. 413; *Gren. Fl. Franc.* iii. 180; *Mogg. Cont. Ment.* t. 36. Bulbus globosus 5–6 lin. crassus. Caulis pedalis et ultra monocephalus, foliis 6–9 supra medium caulis impositis, inferioribus oppositis, supremis sæpissime ternis, omnibus ascendentibus linearibus 2–4 poll. longis 3–4 lin. latis. Perianthium cer-

nuum 12–18 lin. longum, segmentis oblanceolato-oblongis obtusis rectis 4–6 lin. latis utrinque vinoso-purpureis vix tessellatis 3 lin. supra basin nectario parvo oblongo foveolatis. Antheræ apiculatæ $2\frac{1}{2}$–3 lin. longæ filamentis sesqui breviores. Stylus 3 lin. longus, stigmatibus duplo longior. Capsula obovoidea 9–15 lin. longa obtuse angulata collo turbinato. *Alpes Delphinatus et Sabaudiæ.* Var. VERSICOLOR, *Baker*, ex Alpibus maritimis (*Moggridge, Cont. Ment.* t. 36), est forma perianthio, more *F. Meleagridis*, utrinque distincte tessellato. Planta Alpium maritimorum, teste Moggridge, distinguitur caule debili e basi flexuoso.

8. F. ROYLEI, *Hook. Ic.* t. 860.—F. verticillata, *Wall. Cat.* 5079, B, C, D; *Royle, Ill.* 387, t. 92. fig. 2, *non Willd.*—F. Gulielmi-Waldemarii, *Klotzsch, Reise, Wald.* 52, t. 92. Bulbus depresso-globosus 6–9 lin. crassus membranaceo-tunicatus. Caulis 1–2-pedalis apice 1–4-cephalus, foliis 10–25 omnibus sæpissime oppositis vel verticillatis, infimis infra medium impositis geminis lanceolatis obtusiusculis, centralibus linearibus 2–4 poll. longis 3–6 lin. latis acuminatis in verticillos 4–6-foliatos dispositis erecto-patentibus. Pedicelli cernui 3–4 lin. longi foliis linearibus 2–4 erectis nullo modo cirrosis bracteati. Perianthium campanulatum 15–21 lin. longum flavido-viridulo-purpureum facie vinoso-purpureo tessellatum, segmentis oblanceolato-oblongis obtusis rectis 6–9 lin. latis supra basin nectario lato distincto foveolatis. Stamina perianthio subduplo breviora, antheris linearibus 4 lin. longis filamentis sesqui vel duplo brevioribus. Ovarium 4–5 lin. longum; stylus ovario æquilongus stigmata triplo superans. Capsula obtuse angulata. *Regio temperata et alpina Himalayæ occidentalis* (*Ladak, Kashmir, Lahul, Kumaon, &c.*), Royle! Thomson! Strachey et Winterbottom! Wallich! &c.

9. F. CIRROSA, *D. Don, Prodr. Nep.* 51; *Schult. fil. Syst.* vii. 397; *Kunth, Enum.* iv. 253.—F. verticillata, *Wall. Cat.* 5079 A, *non Willd.* Bulbus parvus ovoideus membranaceo-tunicatus. Caulis gracilis monocephalus 1–$1\frac{1}{2}$-pedalis foliis 8–10 anguste linearibus erecto-patentibus, infimis oppositis supra vel infra medium caulis impositis 1–3 poll. longis 2–3 lin. latis, superioribus angustioribus sæpissime in verticillos duos trifoliatos distantes dispositis, 3 supremis ad florem approximatis apice leviter cirrosis. Perianthium late campanulatum 15–18 lin. longum vinoso-purpureum viridulo distincte tessellatum, segmentis oblanceolato- vel obovoideo-oblongis rectis obtusis 4–8 lin. latis supra basin nectario parvo oblongo conspicuo foveolatis, interioribus distincte latioribus. Stamina perianthio subduplo breviora, antheris flavis apiculatis 3 lin. longis filamentis pubescentibus duplo brevioribus. Ovarium 3–4 lin. longum; stylus 6–7 lin. longus apice leviter tricuspidatus. Capsula obovoidea 6–9 lin. longa obtuse angulata.

Regiones temperatæ et alpinæ Himalayæ orientalis; *Nepalia*, Wallich! *Sikkim*, 11000–16000 *pedes*, Dr. Hooker!

10. F. VERTICILLATA, *Willd. Sp.* ii. 91; *Wickst. Act. Holm.* ii. t. 5. fig. 4; *Led. Ic.* t. 2; *Schult. fil. Syst.* vii. 397, 1688; *Kunth, Enum.* iv. 252.—F. leucantha, *Fisch. Grah. Bot. Mag.* t. 3083; *Kunth, Enum.* iv. 253.—F. scandens, *Fisch. MSS.*—F. altaica, *Pallas, MSS.* Bulbus globosus 6–9 lin. crassus membranaceo-tunicatus. Caulis 1–1½-pedalis, sæpe 1- sed interdum 2–5-cephalus, foliis 20–40 subpatentibus omnibus oppositis vel verticillatis, infimis binis prope medium impositis linearibus vel lanceolatis 2–3 poll. longis 6–9 lin. latis, centralibus linearibus 4–8nis, supremis 1½–2 lin. latis ab floribus remotis apice distincte cirrosis. Pedicelli cernui foliis 2–4 ascendentibus 2–3 poll. longis anguste linearibus apice insigniter cirrosis bracteati. Perianthium late campanulatum 12–15 lin. longum albidum vel flavum basi viridulum nullo modo tessellatum purpureo punctatum, segmentis obtusis rectis 4–8 lin. latis supra basin nectario parvo lato 1½ lin. longo foveolatis, interioribus magis obovatis. Stamina perianthio duplo breviora, antheris obtusis flavidis 3 lin. longis filamentis duplo brevioribus. Ovarium 3–4 lin. longum; stylus ovario æquilongus, stigmata 3–4-plo superans. Capsula quadrangulata 9–12 lin. longa et lata angulis late alata. *Ad montes Altai.*

Var. THUNBERGII.—F. Thunbergii, *Miquel, Ann. Mus. Lug. Bat* iii. 155.—Uvularia cirrosa, *Thunb. Jap.* 136; *Kunth, Enum.* iv. 202.—F. collicola, *Hance, Seem. Journ.* viii. 76. Folia superiora sæpe sparsa. Antheræ 3–4 lin. longæ filamentis interdum æquilongæ. Stylus ovarium 1½–2-plo superans. *China*, Fortune, 27! Tarrant (Hance, 1165). *Japonia*, Thunberg, Siebold.

11. F. RUTHENICA, *Wickst. Act. Holm.* ii. 1821, 6, t. 5. fig. 2; *Schult. fil. Syst.* vii. 396; *Grah. in Sweet, Brit. Flow. Gard.* ser. ii. t. 343; *Kunth, Enum.* iv. 252; *Led. Ross.* iv. 148.—F. verticillata, *Bieb. Flor. Taur.* i. 268, *non Willd.*—F. heterophylla, *Soland. in hb. Mus. Brit.* Bulbus parvus globosus membranaceo-tunicatus. Caulis gracilis 1–2-pedalis apice 1–3-cephalus, foliis 6–20 omnibus sparsis anguste linearibus, infimis prope medium impositis 4–5 poll. longis 1½–2 lin. latis acuminatis, supremis ab floribus remotis apice sæpissime distincte cirrosis. Pedicelli conferte racemosi cernui 3–6 lin. longi, singuli foliis 2 vel pluribus lineari-subulatis 2–3 poll. longis ascendentibus apice insigniter cirrosis bracteati. Perianthium late campanulatum 12–15 lin. longum livide vinoso-purpureum obscure tessellatum, segmentis oblanceolato-oblongis acutiusculis apice puberulis medio 3–4 lin. latis supra basin nectario oblongo distincte foveolatis. Stamina perianthio ultra duplo breviora, antheris obtusis 2 lin. longis filamentis subduplo brevioribus. Ovarium 3 lin. longum; stylus ovario paulo

brevior, stigmatibus æquilongus. Capsula acute angulata. *Sarepta, Caucasus, Alatau.*

12. F. LUTEA, *Miller, Dict.* edit. 8, No. 4; *M. Bieb. Taur. Cauc.* i. 269; *Pl. Ross.* i. 61; *Schult. Syst.* vii. 394; *Kunth, Enum.* iv. 250, *non Reich. Ic.* t. 975.—F. latifolia, var. lutea, *Bot. Mag.* t. 1538.—F. collina, *Adam in Weber & Mohr, Beiträge,* i. 50. Bulbus parvus globosus membranaceo-tunicatus. Caulis ½–1-pedalis sæpissime monocephalus, foliis 6–10 glaucis supra medium impositis, inferioribus sparsis oblanceolatis 6–12 lin. latis, superioribus linearibus sæpe oppositis vel ternis. Perianthium cernuum late campanulatum basi truncatum expansum 15–18 lin. latum 15–18 lin. longum flavum viridi venosum purpureo plus minusve suffusum, segmentis oblongo-oblanceolatis 5–8 lin. latis supra basin nectario viridi oblongo integro vel emarginato impresso foveolatis. Stamina perianthio subduplo breviora, antheris flavis vel purpurascentibus 3 lin. longis filamentis duplo brevioribus. Ovarium 4 lin. longum; stylus 5–6 lin. longus stigmata crassa 3–4-plo superans. Capsula obovoidea 1½-pollicaris obtuse angulata. *Caucasus, in hortis nostris perdiu culta.*

Var. LATIFOLIA—F. latifolia, *Willd. Sp. Plant.* ii. 92; *Red. Lil.* t. 51; *Bot. Mag.* t. 853, 1207.—F. esculenta, *Adam in Weber & Mohr, Beiträge,* i. 52. Perianthium saturate vinoso-purpureum, viridulo vel flavido tessellatum. *Cum forma typica promiscue in locis natalibus et hortis.*—F. GLAUCESCENS, *Willd., Kunth, Enum.* iv. 250, est forma inter *luteam* et *latifoliam* media foliis sparsis; F. LATIFOLIA, *K. Koch, Walp. Ann.* vi. 106, ab planta nostra differt foliis viridibus; F. AUREA, *Schott, Œstr. Woch.* 1854, 137; *Walp. Ann.* vi. 106 (*Taurus Ciliciæ,* Kotschy), ab *lutea* dicitur differre foliis inferioribus sæpe verticillatis, tessellis crebrioribus obsoletioribus sæpe maculis vel lineolis tantum indicatis, segmentis 7–9-nervatis.

13. F. PALLIDIFLORA, *Schrenck, Enum. Songar.* 5; *Kunth, Enum.* iv. 251; *Led. Fl. Ross.* iv. 148; *Regel, Gartenflora,* t. 209. Bulbus globosus 4–6 lin. crassus membranaceo-tunicatus. Caulis monocephalus 6–9-pollicaris, foliis 6–9, infimis infra medium impositis oppositis vel alternis oblongo-lanceolatis obtusiusculis 2–3 poll. longis 9–12 lin. latis, supremis lanceolatis acuminatis sæpe 2–3nis. Perianthium cernuum late campanulatum 15–18 lin. longum flavum intus maculis paucis purpureis, segmentis oblongo-oblanceolatis rectis obtusis 6–8 lin. latis supra basin nectario viridi oblongo profunde impresso foveolatis. Stamina perianthio triente breviora, antheris lineari-oblongis 3–4 lin. longis flavis apiculatis filamentis duplo brevioribus. Ovarium 3–4 lin. longum; stylus 5–6 lin. longus stigmata 3–4plo superans. Capsula obovoidea acute angulata. *Siberia centralis meridionalis* (*Altai, Songaria, &c.*), *Mongolia ad montes Tian-schan, alt.* 8000 *pedes,* Semenow!

Var. PLURIFLORA, *Regel, Enum. Semenow,* p. 120, est forma 2-oligocephala.

14. F. MELEAGROIDES, *Patrin, in Schult. Syst. Veg.* vii. 395 (1829). —F. minor, *Led. Fl. Alt.* ii. 34 (1830); *Ic.* ii. 12, t. 130; *Grah. Bot. Mag.* t. 3280; *Kunth, Enum.* iv. 252.—F. longifolia, *Fisch. in herb. DC.* Bulbus globosus 4–6 lin. crassus membranaceo-tunicatus. Caulis gracillimus sæpissime monocephalus 1–2-pedalis foliis 3–6 supra medium impositis omnibus sparsis anguste linearibus acuminatis 2–3 poll. longis 1–2 lin. latis. Perianthium campanulatum 9–12 lin. longum, saturate vinoso-purpureum obscure tessellatum, segmentis oblanceolato-oblongis rectis obtusis medio 4–6 lin. latis supra basin nectario parvo foveolatis. Stamina perianthio duplo breviora, antheris acutis 2 lin. longis filamentis triplo brevioribus. Ovarium 3–4 lin. longum; stylus $1\frac{1}{2}$ lin. longus, stigmatibus æquilongus vel brevior. Capsula obovoidea 6–8 lin. longa obtuse angulata. *Siberia occidentalis ab montibus Altai ad Songariam.*

15. F. LUSITANICA, *Wikst. Act. Holm.* 1821, ii. 9, t. 5. fig. 1; *Schult. Syst.* vii. 388; *Kunth, Enum.* iv. 248; *Boiss. Diagn.* ii. iv. 101.—F. Melagris, *Brot. Fl. Lusit.* i. 520, *non Linn.* Bulbus globosus membranaceo-tunicatus 5–6 lin. crassus. Caulis monocephalus gracilis 9–15-pollicaris. Folia 7–8 sparsa ascendentia linearia acuminata, infima infra medium caulis imposita 3–4 poll. longa 3–4 lin. lata. Perianthium cernuum 9–12 lin. longum saturate vinoso-purpureum obscure tessellatum, segmentis oblanceolato-oblongis 4–6 lin. latis, paulo supra basin foveola oblonga instructis. Antheræ 2 lin. longæ filamentis duplo breviores. Ovarium 4 lin. longum; stigmata $1\frac{1}{2}$–2 lin. longa stylo duplo vel sesqui breviora. *Lusitania,* Welwitsch! Castello de Paiva!

Var. HISPANICA.—F. hispanica, *Boiss. & Reut. Diagn.* ii. iv. 101.—F. messanensis, *Boiss. Voy. Esp.* i. 610; *Kunth, Enum.* iv. 248, *ex parte.* Caulis raro 2-cephalus. Folia numerosiora, sæpe 8–10, omnia sparsa prope medium caulis conferta, inferiora 3–6 lin. lata. Perianthium 12–16 lin. longum, interdum intus distincte tessellatum, segmentis 5–8 lin. latis exterioribus dorso viridi carinatis. Antheræ 3 lin. longæ. Stigmata stylo 2–3-plo breviora. *Hispania in regione alpina montium Sierra Nevada, Sierra de Guadarrama, &c.* Bourgeau! Boissier & Reuter! Ball! *In Pyrenæis prope L'heris,* Philippe!

Var. STENOPHYLLA.—F. stenophylla, *Boiss. & Reut. Diagn.* ii. iv. 100. Folia 8–10 anguste linearia distantia, inferiora vix ultra 1–$1\frac{1}{2}$ lin. lata. Perianthium 9–12 lin. longum, saturate vinoso-purpureum vix tessellatum sed segmentis exterioribus dorso interdum distincte viridi vittatis. Stigmata stylo paulo breviora. *Lusitania,* Welwitsch! Castello de Paiva! Bourgeau! *Hispania,* Webb! Bourgeau! Hurst!

—F. lutea lancifolia lusitanica, *Parkins. Parad.* 43, est forma floribus luteis rubello maculatis.

Var. NEGLECTA.—F. neglecta, *Parl. Fl. Ital.* ii. 416.—F. messanensis, *Reich. Ic.* t. 981–2.—F. nervosa, *Unio Itineraria, anno* 1829 *Exsic. non Willd.* Folia 8–10 distantia inferiora 4–5 poll. longa 3 lin. lata. Perianthium 15–18 lin. longum minus luridum vix tessellatum. Stigmata stylo paulo breviora. *Germania littoralis,* Visiani ! Zohrab ! &c.

Var. ALGERIENSIS, *Baker.* Folia 7–8 omnia distantia supra medium caulis imposita. Perianthium luridum haud tessellatum. *Algeria prope Oran,* Balansa 223 ! Bovè !

16. F. PYRENAICA, *L. Sp.* edit. i. 304 ; *Bot. Mag.* t. 664 ; *Reich. Ic.* t. 976 ; *Gren. Fl. Franc.* iii. 179 ; *Belg. Hort.* t. 49. fig. 4.—F. pyrenæa, *Parkins. Parad.* 41, t. 11 (1629).—F. Meleagris δ, *Linn. Sp.* edit. i. 304.—F. Meleagris, *Lap. Abr.* 183.—F. aquitanica (*Clusius*), *Mill. Dict.* No. 2.—F. nigra (*Lobel*), *Mill. Dict.* No. 3; *Gawl. Bot. Mag. sub* t. 1538.—F. nervosa, *Willd. Enum.* 364 ; *Kunth, Enum.* iv. 251.—F. racemosa, *Kunth, Enum.* iv. 249 *ex parte.* Bulbus globosus membranaceo-tunicatus 4–6 lin. crassus. Caulis 1–1½-pedalis sæpissime monocephalus. Folia 6–10 sparsa ascendentia 2–3 poll. longa glauca subplana, superiora linearia 1–2 lin. lata, inferiora infra medium caulis imposita ligulata 3 vel in planta culta 6–9 lin. lata. Perianthium cernuum leviter fœtidum 15–18 lin. longum extus saturate vinoso-purpureum maculis paucis obscuris viridibus intus nitide viridulum tesseris vinosis paucis, segmentis obovato-oblongis 5–6 vel interdum 7–9 lin. latis apice flore expanso porrectis interioribus latioribus basi deltoideis, omnibus prope basin foveola oblonga viridi 3 lin. longa instructis. Antheræ 3 lin. longæ, filamentis viridibus sesqui breviores. Ovarium 3–4 lin. longum ; stigmata stylo sesqui breviora. Capsula late oblonga obtuse angulata 9–12 lin. longa, collo distincto turbinato. *Regio alpina montium Galliæ meridionalis et Hispaniæ borealis.* In hortis nostris diu culta ; floret ad initium Maii, post *Meleagridem.*—F. NIGRA, *Miller,* est forma hortensis hujus speciei floribus 3–4, foliis 6–9 lin. latis.—F. AQUITANICA, *Miller,* est forma foliis infimis oppositis. Var. LUTESCENS, *Lindl. MSS.,* est forma segmentis exterioribus dorso late flavido viridi carinatis.—F. UMBELLATA, *Mill. Dict.* 5 (F. umbellifera, *Parkins. Parad.* 41, t. 12) est fortasse forma luxurians hortensis floribus pluribus congestis "umbellatis."

17. F. OLIVIERI, *Baker.* Bulbus globosus tunicatus 6–9 lin. crassus. Caulis 1–1½-pedalis monocephalus. Folia 7–10 ascendentia glabra sæpissime sparsa, infima interdum lanceolata 3–3½ poll. longa 6–9 lin. lata, reliqua linearia acuta 3–4 poll. longa. Perianthium cernuum campanulatum 15–16 lin. longum, saturate vinoso-purpureum haud

tessellatum, segmentis obovato-oblongis semipollicem latis apice subdeltoideis distincte puberulis supra basin nectario oblongo distincto 3–4 lin. longo foveolatis. Stamina perianthio duplo breviora, antheris 3–4 lin. longis filamentis applanatis valde puberulis sesqui brevioribus. Ovarium 4–4½ lin. longum; stylus 2 lin. longus stigmatibus æquilongus. *Persia ad montem Elwind*, Olivier in herb. DC.! Ad *F. pyrenaicam* arcte accedit.

18. F. ACMOPETALA, *Boiss. Diagn.* vii. 104; *Walp. Ann.* i. 851. Bulbus 5–6 lin. crassus membranaceo-tunicatus. Caulis gracilis 1–2-pedalis monocephalus. Folia 6–9 ascendentia sparsa anguste linearia, inferiora 5–6 poll. longa 1½–2 lin. lata infra medium caulis imposita. Perianthium 15–18 lin. longum cernuum, segmentis oblanceolato-oblongis 5–6 lin. latis obtusis vel cuspidatis luride vinoso-purpureis vel deorsum viridibus. Antheræ 3 lin. longæ obtusæ filamentis pubescentibus duplo breviores. Ovarium 4 lin. longum. Stylus 4 lin. longus stigmata vix excedens. *In regione alpina montium Syriæ et Asiæ minoris*, Aucher-Eloy, 2181; Kotschy, iter cilicico-kurdicum, 87! Forbes, 623!—F. LYCIA, *Boiss. & Held. Diagn.* xiii. 20, ex descriptione, non potui distinguere.

19. F. KOTSCHYANA, *Herb. Bot. Reg.* xvii.; *Misc.* 43; *Walp. Ann.* i. 851. Bulbus membranaceo-tunicatus. Caulis pedalis monocephalus. Folia 4–6 ascendentia supra medium caulis imposita sparsa glauca linearia acuta, inferiora 3–4 poll. longa 4–6 lin. lata, suprema angustiora. Perianthium cernuum 15–18 lin. longum, vinoso-purpureum, utrinque concolor distincte tessellatum, segmentis oblongo-spathulatis apice porrectis medio 6–7 lin. latis prope basin fovea parva lata instructis. Antheræ luteæ 4–4½ lin. longæ filamentis æquilongæ. Capsula turbinata obtuse angulata. *Persia borealis in regione alpina montis Elbrus*, Kotschy, 507! *Wassula & Schadschan, alt.* 5000–6000 *pedes*, Buhse.

20. F. GRÆCA, *Boiss. & Sprun. Diagn.* vii. 104; *Walp. Ann.* i. 851; *Bot. Mag.* t. 5052.—F. pyrenaica, *Sibth. & Sm. Fl. Græc.* t. 328, *non L.* Bulbus depresso-globosus membranaceo-tunicatus 6–8 lin. crassus. Caulis 3–9-pollicaris flexuosus sæpissime monocephalus, foliis 4–8, infimis sæpissime alternis lanceolatis 2–4 poll. longis 3–6 lin. latis, superioribus linearibus acuminatis. Perianthium cernuum campanulatum 7–10 lin. longum luride vinoso-purpureum haud tessellatum, segmentis rectis oblanceolato-oblongis obtusis 4–5 lin. latis dorso sæpe viridi carinatis, interioribus distincte latioribus, omnibus supra basin nectario lato parvo foveolatis. Genitalia perianthio triente breviora. Antheræ flavæ obtusæ filamentis ciliatis 2–3plo breviores. Ovarium 2–2½ lin. longum; stylus 1½–2 lin. longus, stigmata paulo superans. *In montibus Atticæ (Hymettus, &c.)*, 1000–

4000 *pedes.* De Heldreich! Orphanides!—F. PLANTAGINIFOLIA, *Lam. Ency.* ii. 250, ex "Levant," ab icone Tournefortiana descripta, ex descriptione brevi ad *græcam* arcte accedit, vel forsan eadem est.

21. F. TRISTIS, *Held. & Sart. in Boiss. Diag. ser.* 2, iv. 104.—Bulbus depresso-globosus membranaceo-tunicatus 4–6 lin. crassus. Caulis ½–1-pedalis 1–2-cephalus foliis 6–10 supra medium impositis, infimis lanceolatis 3–4 poll. longis, 6–9 lin. latis, sæpe oppositis, reliquis sparsis minoribus angustioribus acuminatis. Perianthium subcernuum, infundibuliformi-campanulatum, 9–12 lin. longum, lividissime vinoso-purpureum haud tessellatum segmentis obtusis oblanceolato-oblongis utrinque concoloribus haud venosis supra basin nectario parvo lato foveolatis. Antheræ 2 lin. longæ flavæ filamentis duplo breviores. Ovarium 3 lin. longum, stylus 4 lin. longus, stigmatibus quadruplo superans. Capsula obovoidea obtuse angulata collo turbinato. *In montibus Atticæ* (*Parnes, Lycabettus, Hymettus*) De Heldreich!

22. F. CONICA, *Boiss. Diagn.* vii. 105; *Walp. Ann.* i. 852.—F. tulipifolia, *Bory & Chaub. Exp. Mor.* 98, *non M. B., teste Boissier.* Caulis 1–2-cephalus 6–18-pollicaris, foliis 5–10, infimis lanceolatis sæpe oppositis 1–3 poll. longis 12–16 lin. latis obtusis, superioribus sparsis linearibus 1–3 lin. latis. Perianthium infundibuliformi-campanulatum 8–9 lin. longum, segmentis oblongo-oblanceolatis 3–4 lin. latis nectario parvo foveolatis. Stamina perianthio subtriente breviora. Pistillum perianthio æquilongum, stylo ultra tertiam partem trifido ovario æquilongo. *In Peloponneso prope Navarino,* Bory (non vidi).

23. F. GUICCIARDII, *Held. et Sart. in Boiss. Diagn.* ser. 2, iv. 102. Caulis 6–9-pollicaris, 2–5- raro 1-cephalus, foliis 7–11 sparsis confertis, infimis lanceolatis subobtusis 2 poll. longis 6–9 lin. latis, superioribus anguste linearibus 1½–2 lin. latis. Perianthium campanulatum, 1 poll. longum, segmentis oblongo-spathulatis haud tessellatis dorso viridi fasciatis, exterioribus acutioribus angustioribus. Stamina perianthio duplo breviora, antheris filamentis glabris subæquilongis. Pistillum stamina superans, stylo fere ad medium trifido ovarium superante. *Ad cacumen montis Parnethos Atticæ, 4500 pedes,* Guicciardi, &c. (non vidi).

24. F. HERMONTIS, *Fenzl, in Kotschy Pl. Syr. Exsic. anno* 1855, no. 184; *Klatt, Hamb. Gartenzeit.* xvi. 442. Bulbus parvus membranaceo-tunicatus. Caulis flexuosus monocephalus 3–4-pollicaris, foliis 4–5 sparsis confertis infimis oblongo-lanceolatis acutis 2–3 poll. longis, 6–9 lin. latis supremis anguste linearibus. Perianthium subcernuum campanulatum 7–8 lin. longum segmentis vinoso-purpureis haud tessellatis dorso viridulis oblongo-oblanceolatis acutiusculis 3–4 lin. latis prope basin nectario lato foveolatis. Antheræ obtusæ filamentis ciliatis pallidis æquilongæ. Ovarium 2 lin. longum; stylus

$1\frac{1}{2}$ lin. longus, stigmata paulo superans. *Palæstina in cacumine montis Hermon,* 9000–9500 *pedes,* Kotschy! Lowne!

25. F. CRASSIFOLIA, *Boiss. & Huet, Diagn.* ser. 2, iv. 103. Bulbus depresso-globosus membranaceo-tunicatus 6–9 lin. crassus. Caulis 4–6-pollicaris sæpissime monocephalus, foliis 5–6 confertis sparsis supra medium impositis, infimis oblongo-spathulatis 2–3 poll. longis 6–9 lin. latis, superioribus linearibus acuminatis. Perianthium campanulatum subcernuum 9–12 lin. longum saturate vinoso-purpureum leviter tessellatum, segmentis rectis obtusis oblanceolato-oblongis 4–6 lin. latis supra basin nectario parvo lato foveolatis. Genitalia perianthio triente breviora. Antheræ $1\frac{1}{2}$–2 lin. longæ obtusæ filamentis ciliatis 2–3plo breviores. Ovarium 2–$2\frac{1}{2}$ lin. longum, stylo æquilongum, stigmata 2–3plo superans. Capsula turbinata obtuse angulata. *In regione alpina montium Armeniæ,* Aucher-Eloy, 2092! 2420! 5376! Huet du Pavillon! Calvert! Zohrab! *Taurus,* Kotschy! *In cacumine Gebel el Cheik,* Aucher-Eloy, 2180! *Lycia, Mt. Cragus,* Forbes, 622! *Libanus,* Aucher-Eloy, 290, in herb. DC.! Hayne!

26. F. KURDICA, *Boiss. & Noé, Diagn.* ser. 2, iv. 103. Caulis monocephalus 2–3-pollicaris, foliis 5 omnibus sparsis, infimis lanceolatis 1–$1\frac{1}{2}$ poll. longis 4–5 lin. latis, supremis anguste linearibus. Perianthium circiter semipollicem longum, segmentis obtusiusculis purpureis tessellatis extus dorso viridi fasciatis, supra basin nectario ovato foveolatis. Genitalia perianthio triente breviora. Antheræ filamentis papillosis subduplo breviores. Stylus stamina leviter superans, fere ad medium trifidus. *In subalpinis Kurdistaniæ prope Van,* Noé (non vidi)!

Subgenus III. AMBLIRION (*Raf.*). *Bulbus* membranaceo-tunicatus. *Stylus* apice stigmatoso indivisus. *Caulis* sæpissime monocephalus. *Foveolæ* parvæ obscuræ æquales, carinales vel ovatæ.—Eucrinum, *Nuttall.*

27. F. BITHYNICA, *Baker.* Bulbum non vidi. Caulis subpedalis 2-cephalus triente inferiore nudo, foliis 10–12 ascendentibus sparsis, inferioribus lanceolatis 2 poll. longis 3–4 lin. latis, superioribus angustioribus. Pedicelli cernui foliis linearibus bracteati. Perianthium flavum 1 poll. longum, segmentis oblanceolatis obtusis rectis haud tessellatis, 3 lin. latis nectario obscuro supra basin foveolatis. Stamina perianthio duplo breviora, antheris obtusis $2\frac{1}{2}$ lin. longis filamentis pilosis paulo longioribus. Ovarium 3 lin. longum, stylo recto indiviso paulo brevius. *Bithynia in Monte Olympo,* Noé!

28. F. FORBESII, *Baker.* Bulbus globosus 4–5 lin. crassus membranaceo-tunicatus. Caulis 1–2-pedalis monocephalus gracillimus, foliis

6–10 supra medium impositis sparsis linearibus distantibus 4–5 poll. longis 1–3 lin. latis ascendentibus acuminatis. Perianthium cernuum infundibuliformi-campanulatum 9–12 lin. longum pallide vinoso-purpureum haud tessellatum, primum extus viridulum, segmentis rectis oblanceolatis obtusis medio 2–2½ lin. latis prope basin obscure foveolato-carinatis. Stamina perianthio subduplo breviora, antheris obtusis filamentis pubescentibus duplo brevioribus. Ovarium 2–2½ lin. longum; stylus 3 lin. longus indivisus puberulus. *Lycia in dumetis rupestribus ad Macri,* E. Forbes, 626! Elwes!

29. F. Gardneriana, *Wall. Cat.* No. 5080. Bulbum non vidi. Caulis 9–18-pollicaris monocephalus foliis 9–15 omnibus sparsis ascendentibus linearibus 2–6 poll. longis 1½–2 lin. latis, infimis parvis prope basin impositis. Perianthium cernuum 1 poll. longum, segmentis oblongo-oblanceolatis 4–6 lin. latis acutiusculis pallidis haud tessellatis facie triente inferiore punctis crebris saturate purpureis sparsis nectario obscuro carinali foveolatis. Stamina perianthio vix duplo breviora, antheris obtusis 2 lin. longis filamentis triplo brevioribus. Ovarium 4 lin. longum; stylus ovario paulo brevior, indivisus, apice stigmatoso capitatus. *Nepalia ad montem Gossain Than,* Gardner! *Sikkim, regio temperata,* 9000–10,000 *pedes,* Dr. Hooker!

30. F. Pinardi, *Boiss. Diagn.* vii. 106; *Walp. Ann.* i. 852.—Theresia Pinardi, *Klatt, Hamb. Gartenzeit.* xvi. 439. Bulbus parvus membranaceo-tunicatus. Caulis semipedalis gracilis sæpe monocephalus foliis 5–7 ascendentibus omnibus sparsis, inferioribus lanceolatis 1½–2 poll. longis, 3–4 lin. latis, superioribus linearibus sensim acuminatis. Perianthium cernuum 8–9 lin. longum, segmentis oblongo-oblanceolatis 3–3½ lin. latis obtusis haud tessellatis, exterioribus saturate purpureis apice viridibus, interioribus pallidioribus, omnibus intus flavo-viridibus supra basin nectario parvo lato foveolatis. Antheræ 2 lin. longæ mucronulatæ filamentis pubescentibus sesqui breviores. Ovarium cylindricum 2 lin. longum stylo integro duplo brevius. *Caria,* Pinard!

31. F. assyriaca, *Baker.* Bulbus globosus 3–4 lin. crassus membranaceo-tunicatus. Caulis ½–1-pedalis gracilis monocephalus, foliis 4–6 supra medium impositis, sæpissime sparsis, infimis oblanceolatis 2–4 poll. longis 3–5 lin. latis, superioribus linearibus. Perianthium anguste campanulatum 6–7 lin. longum vinoso-purpureum vix tessellatum segmentis oblanceolatis 2 lin. latis nectario obscuro foveolatis. Stamina perianthio triente breviora, antheris obtusis 1½ lin. longis filamentis applanatis pubescentibus triplo brevioribus. Ovarium 3 lin. longum; stylus ovario æquilongus apice obscure trilobatus. *Assyria in dumetis supra Terek,* Haussknecht!

32. F. Ehrharti, *Boiss. et Orph. Diag.* ii. iv. 105. Caulis humilis

monocephalus, foliis 6–8 supra medium impositis, inferioribus confertis oblongo-lanceolatis, infimis oppositis, supremis sparsis anguste linearibus. Perianthium obconicum basi vix gibbosum, segmentis saturate purpureis apice flavis obtusis ciliatis. Stamina perianthio triente breviora antheris muticis filamentis glabris paulo brevioribus. Ovarium cum stylo indiviso stamina superans, perianthio paulo brevius. *Insula Syra*, Orphanides (non vidi).

33. F. Fleischeri, *Steud. & Hochst. Unio Itin.* 1827, *Exsic.*; *Kunth, Enum.* iv. 248.—F. Fleischeriana, *Schult. Syst.* vii. 388.—Theresia Fleischeri, *Klatt, Hamb. Gartenzeit.* xvi. 439. Bulbus globosus membranaceo-tunicatus 3–4 lin. crassus. Caulis gracilis flexuosus monocephalus 3–6-pollicaris, foliis 5–6 supra medium caulis impositis linearibus ascendentibus 6–12 lin. longis ½-1 lin. latis, infimis interdum oppositis interdum sparsis supremum ab flore remotum. Perianthium subcernuum 7–8 lin. longum livide vinoso-purpureum nullo modo tessellatum, segmentis oblanceolatis 2–2½ lin. latis supra basin nectario parvo oblongo foveolatis. Stamina segmentis paulo breviora, antheris obtusis 2 lin. longis filamentis duplo brevioribus. Ovarium cylindricum 2 lin. longum, stylo recto indiviso duplo brevius. Capsulam non vidi. *Smyrna in collibus argillosis sylvaticis in Februario florens,* Fleischer!

34. F. tulipifolia, *M. Bieb. Fl. Taur. Cauc.* i. 270; *Pl. Ross.* t. 21; *Kunth, Enum.* iv. 247 ex parte; *Hook. fil. Bot. Mag.* t. 5969.—Theresia tulipifolia, *Klatt, Hamb. Gartenzeit.* xvi. 439, *excl. syn.* Bulbus globosus membranaceo-tunicatus 4–6 lin. crassus. Caulis gracilis flexuosus ½–1-pedalis sæpissime monocephalus, foliis glaucis 2–4 sparsis supra medium impositis, infimis lanceolatis 1½–3 poll. longis medio 6–9 lin. latis, superioribus multo minoribus linearibus acuminatis. Perianthium 8–12 lin. longum, magis infundibuliforme quam in speciebus reliquis livide vinoso-purpureum haud tessellatum, segmentis oblanceolatis acutiusculis medio 2½–3 lin. latis prope basin nectario parvo foveolatis. Stamina segmentis paulo breviora, antheris obtusis filamentis glabris duplo brevioribus. Ovarium cylindricum 3 lin. longum, stylo indiviso interdum leviter exserto duplo brevius. Capsula obovoidea obtuse angulata. *Caucasus, in regione alpina,* Fischer! Hohenacker! Szovits! *Armenia,* Huet du Pavillon! Calvert! Zohrab! *Kurdistan,* Olgum! F. armena, *Boiss. Diagn.* vii. 106 (*Armenia,* Aucher-Eloy, 5377!) est verisimiliter forma mera hujus speciei foliis angustioribus, stylo apice obscure trilobato. F. obliqua, *Gawl. Bot. Mag.* t. 857, est verisimiliter forma hortensis robustior foliis numerosioribus.

Var. dasyphylla, *Baker.* Caulis 3–4-pollicaris, foliis 4–5 confertis, infimis lanceolatis vel oblongis. Genitalia perianthio pallidiore di-

stincte breviora. Stylus ovario duplo longior. *Lycia, prope Cybriam*, E. Forbes, 621 ! Elwes !

Var. KOTSCHYI, *Baker.* Caulis 3–4-pollicaris, foliis 4–5 lanceolatis haud confertis. Perianthium vinoso-purpureum haud lividum. Genitalia perianthio triente breviora, stylo 3 lin. longo, apice obscure lobato, ovario vix longiore. *In monte Tauro*, Kotschy, anno 1838, No. 507 !

35. F. PUDICA, *Spreng. Syst.* ii. 64; *Kunth, Enum.* iv. 255; *Wood, Proc. Acad. Phil.* 1868, 167; *S. Wats. Bot.* 40, *Parall.* 347.—Lilium? pudicum, *Pursh, Flora*, i. 288, t. 8; *Schult. Syst.* vii. 401.—Amblirion pudicum, *Rafin. Journ. Phys.* 89. 102.—Theresia pudica, *Klatt. Hamb. Gart.* xvi. 439. Bulbus depresso-globosus membranaceo-tunicatus 4–6 lin. crassus. Caulis gracilis 3–9-pollicaris sæpe monocephalus, foliis 3–6 supra medium impositis, infimis ligulatis obtusis 2–3 poll. longis 2–3 lin. latis sæpe oppositis, reliquis sparsis linearibus. Perianthium cernuum infundibuliforme 6–12 lin. longum pallide vel saturate flavum vel raro purpureum nullo modo tessellatum, segmentis oblanceolato-oblongis obtusis 2–3 lin. latis, ad basin nectario obscuro carinali foveolatis. Genitalia perianthio paulo breviora. Antheræ flavæ 1½ lin. longæ, filamentis glabris triplo breviores. Ovarium 2–3 lin. longum, stylus indivisus ovarium superans. Capsula obovoidea 8–12 lin. longa obtuse angulata collo magno turbinato. *Montes Scopulosi Americæ borealis* (*Washington, Oregon, Nevada, Utah*, 5000–6000 *pedes alt.*), Douglas ! Geyer, 315 ! &c.

Subgenus IV. KOROLKOWIA (*Regel*). Bulbus membranaceo-tunicatus. Flores racemosi, perianthio subinfundibuliformi, segmentis e basi ad medium carinato-foveolatis, carina segmenti superioris profundiore. Stylus indivisus.

36. F. SEWERZOWI, *Regel, Enum. Pl. Semenow.* No. 1057.—Korolkowia Sewerzowi, *Regel, Animad.* (1873) 17; *Gartenflora*, t. 760. Bulbus globosus 12–15 lin. crassus tunicatus e basi propagulas filiformes laxe squamosas apice foliolis filiformibus vestitas emittens. Caulis 1–1½-pedalis, foliis pluribus sparsis supra medium impositis, infimis lorato-lanceolatis pollicem latis interdum oppositis, superioribus lanceolatis 3–4 poll. longis. Flores 6–10 laxe racemosi, pedicellis apice cernuis 3–6 lin. longis, basi foliis flores multo excedentibus bracteatis. Perianthium 12–15 lin. longum viridulum haud tessellatum extus vinoso tinctum, segmentis oblanceolatis 3–4 lin. latis triente superiore patulis, foveola carinali obscura. Stamina perianthio paulo breviora, filamentis purpureis, antheris oblongis viridibus acutis. Stylus indivisus ovario æquilongus staminibus brevior. *In montibus Turcomaniæ*, 3000–6000 *pedes*, Korolkow.

Subgenus V. Rhinopetalum (*Fisch.*). *Bulbus* membranaceo-tunicatus. *Flores* racemosi haud tessellati. *Foveolæ* parvæ, profundæ, dorso segmentorum, gibbosæ, segmenti superioris magis saccatæ. *Stylus* indivisus.

37. F. Karelini, *Baker.*—Rhinopetalum Karelini, *Fisch. Edin. New Phil. Journ.* 1830, 19; *D. Don, Sweet, Flow. Gard.* t. 283; *Kunth, Enum.* iv. 256.—Fritillaria gibbosa, *Boiss. Diagn.* vii. 107; *Walp. Ann.* i. 852.—Rhinopetalum Boissieri, *Klatt, Hamb. Gart.* xvi. 439.—F. pterocarpa, *Stocks in Hook. Kew Journ.* iv. 180. Bulbus ovoideus membranaceo-tunicatus 6–12 lin. crassus. Caulis 3–6-pollicaris apice racemosus. Folia infra racemum 4–6 opposita vel alterna, infima oblanceolata 2–3 poll. longa, superiora linearia. Racemus densus 2–12-florus, axi puberulo, pedicellis floriferis cernuis 3–6 lin. longis, foliis parvis linearibus bracteatis. Perianthium late campanulatum lilacinum venis verticalibus saturatioribus, haud tessellatum, 6–8 lin. longum, segmentis oblanceolatis acutis medio 2 lin. latis supra basin nectario profunde saccato foveolatis, dorso distincte gibbosis, gibbo segmenti supremo profundiore. Stamina perianthio paulo breviora, antheris subglobosis $\frac{1}{2}$ lin. longis, filamentis ciliatis declinatis. Ovarium $1\frac{1}{2}$ lin. longum, stylo curvato integro subduplo brevius. Capsula depresso-globosa-quadrangula 5–6 lin. longa, interdum 9–10 lin. lata, obtuse angulata, collo turbinato. *Siberia centralis et orientalis meridionalis, Turcomania, Persia,* Kotschy, 827! *Afghanistan,* Griffith, 5791! *Beloochistan,* Stocks, 918!

Subgenus VI. Notholirion (*Wall.*). *Bulbus* membranaceo-tunicatus. *Flores* plurimi racemosi, genitalibus perianthio subæquilongis. *Stylus* apice stigmatoso tricuspidatus. *Capsula* obtuse angulata. *Perianthium* nullo modo tessellatum. Inter *Lilium* § *Eulirion* et *Fritillariam* ambigit; perianthium infundibuliforme concolor nectario obsoleto carinali, et genitalia elongata leviter declinata prioris; bulbus scarioso-tunicatus et stylus apice distincte tricuspidatus posterioris.

38. F. macrophylla, *D. Don, Prod. Nep.* 51 (1825); *Schult. Syst.* vii. 399; *Kunth, Enum.* iv. 253.—Lilium roseum, *Wall. Cat.* 5077 (1832); *Hook. Bot. Mag.* t. 4725; *Belg. Hort.* 1853, t. 21.—Fritillaria Thomsoniana, *D. Don in Royle, Ill.* 388, t. 92 (1839); *Kunth, Enum.* iv. 672.—Lilium Thomsonianum, *Lindl. Bot. Reg.* vol. xxxi. (1845) tab. 1; *Spae, Mon.* 9; *Walp. Ann.* i. 852; *Rev. Hort.* 1868, t. 231.—L. longifolium, *Griff. Icones,* t. 277; *Itin.* 345. Bulbus ovoideo-cylindricus 1 poll. crassus tunicis scariosis pluribus 2 poll. vel ultra longis, exterioribus striatis cinctus in axillis bulbilliferis.

Caulis $1\frac{1}{2}$–3-pedalis erectus teres glaber. Folia 20–30 ascendentia linearia, in axillis bulbillifera, inferiora crebra 12–18 lin. longa 3–4 lin. lata, superiora breviora laxiora. Racemus 12–18 poll. longus, 6–30-florus, expansus 3–4 poll. latus, floribus inferioribus cernuis, superioribus minoribus ascendentibus. Bracteæ solitariæ lineares 9–18 lin. demum sæpe 2–3 poll. longæ. Perianthium infundibuliforme roseo-lilacinum odorum 18-24 lin. longum nullo modo tessellatum, segmentis oblanceolatis longe supra medium 3–4 lin. latis apice patulis, longe unguiculatis, prope basin albido-purpureo carinatis. Filamenta filiformia segmentis paulo breviora; antheræ albido-lilacinæ 3–4 lin. longæ polline flavo. Ovarium 4–5 lin. longus; stylus filiformis 15–18 lin. longus, stigmatibus parvis recurvato-patentibus. Capsula ovoideo-oblonga 12–15 lin. longa obtuse 6-angulata apice umbilicata distincte 6-umbonata. *Afghanistan,* Griffith, 5796! *Regio subtemperata Himalayæ occidentalis,* Wallich! Royle! Strachey and Winterbottom! *In Nepalia ad montem Gossain Than,* Wallich! De bulbis vide Duchartre, *Ann. Sc. Nat.* sér. 5, tom. xvi. 326, t. 15–17.

39. F. Hookeri, *Baker.*—Lilium (Notholirion) Hookeri, *Baker, Gard. Chron.* 1871, 201. Bulbus ovoideus scarioso-tunicatus 6–9 lin. crassus. Caulis $1-1\frac{1}{2}$-pedalis apice racemosus. Folia 6–10 sparsa linearia ascendentia, inferiora 5–6 poll. longa 3-4 lin. lata, superiora sensim breviora et angustiora. Racemus laxus secundus 3–8-florus, 3-6-pollicaris, bracteis foliaceis linearibus, infimis 1–2 poll. longis, pedicellis 3–9 lin. longis, floriferis subcernuis, fructiferis ascendentibus, floribus supremis multo minoribus. Perianthium roseo-lilacinum haud tessellatum, 9–15 lin. longum infundibuliforme segmentis oblanceolatis obtusis supra medium 3–4 lin. latis nectario obscuro carinali basali. Filamenta declinata segmentis paulo breviora, antheris obtusis 2 lin. longis. Ovarium cylindricum 5–6 lin. longum; stylus 6–8 lin. longus, stigmatibus 1 lin. longis filiformibus recurvato-patentibus. Capsula oblonga 6–8 lin. longa apice umbilicata. *Sikkim Himalaya, regio temperata, alt.* 9000–10000 *pedes,* Dr. Hooker!

Subgenus VII. Theresia (*K. Koch*). *Bulbus* squamosus. *Stylus* indivisus. *Flores* sæpissime plures racemosi, foveolis parvis latis æqualibus leviter saccatis.—Lyperia, *Salisb.* Tozzettia, *Parlatore.*

40. F. persica, *Linn. Sp.* 436; *Red. Lil.* t. 67; *Bot. Mag.* t. 1537; *Kunth, Enum.* iv. 247.—Theresia persica, *K. Koch, Linn.* xxii. 233. Bulbus squamosus pro genere magnus, albidus globosus inodorus perennis. Caulis 2–3-pedalis robustus apice racemosus, foliis 40–60 sparsis obliquis erecto-patentibus glaucis linearibus 4–6 poll. longis medio 6–9 lin. latis acuminatis, infimis interdum oppositis. Racemus

10–50-florus confertus 3–6 poll. longus, pedicellis cernuis foliis reductis linearibus bracteatis. Perianthium campanulatum leviter odorum 6–9 lin. longum lilacino-purpureum haud tessellatum, segmentis oblanceolatis rectis obtusis 1½–2 lin. latis nectario lato parvo viridi prope basin foveolatis. Stamina perianthio paulo breviora, antheris oblongis 1 lin. longis purpureis, filamentis viridibus quadruplo brevioribus. Stylus viridis indivisus ovario subæquilongus. Capsula quadrangulata obtuse angulata. *Ex Oriente in hortis perdiu culta ad finem Aprilis vel initium Maii florens.* Var. MINOR, *Sims, Bot. Mag.* t. 962 (*excl. syn.*), est forma floribus minoribus antheris interdum subexsertis.

41. F. LIBANOTICA, *Baker.*—Theresia libanotica, *Boiss. Diagn.* xiii. 20. Bulbus squamosus pro genere magnus. Caulis 2–3-pedalis robustus apice racemosus, foliis 40–60 sparsis lanceolatis glaucis 3–4 poll. longis 6–9 lin. latis interdum oppositis vel ternis. Racemus 6–30-florus, expansus 2½–3 poll. latus. Pedicelli cernui, foliis parvis bracteati. Flores odore gravi. Perianthium campanulatum 6–9 lin. longum pallide lilacinum venis verticalibus ramosis saturatioribus, segmentis rectis oblanceolato-oblongis late imbricatis 3–4 lin. latis prope basin nectario lato parvo foveolatis. Stamina perianthio triente breviora, antheris purpurascentibus obtusis 1 lin. longis, filamentis dodrante brevioribus. Stylus indivisus cum ovario æquilongo staminibus brevior. Capsula globoso-quadrangulata obtuse 6-angulata 6–9 lin. longa, 10–12 lin. crassa. *Palæstina in lapidosis umbrosis regionis mediæ Libani,* Boissier! *Kerek,* Dr. Roth! *Esdraelon,* Dr. Lowne! *Nain,* Hayne! *El Meain,* Post!—F. Reygassei, *Boiss. et Blanche, Exsic.,* ex exemplis visis non potui distinguere.

42. F. PLURIFLORA, *Torrey, Benth. Pl. Hartweg.* 338. Bulbus magnus 1½ poll. crassus squamis copiosis crassis bulbilliformibus cinctus. Caulis 1–1½-pedalis robustus apice racemosus, foliis 8–12 ascendentibus prope medium aggregatis, infimis sæpissime oppositis oblanceolatis 4–5 poll. longis 6–9 lin. latis obtusiusculis, reliquis sparsis angustioribus acutis. Racemus 4–12-florus deorsum laxus, pedicellis ascendentibus 6–18 lin. longis foliis linearibus bracteatis, inferioribus apice subcernuis, superioribus erectis. Perianthium infundibuliformi-campanulatum 9–12 lin. longum roseo-purpureum nullo modo tessellatum, segmentis oblanceolatis obtusis supra medium 2½–3 lin. latis dimidio inferiore nectario viridi carinali obscuro foveolatis. Stamina perianthio triente breviora, antheris obtusis flavis 1½–2 lin. longis filamentis triplo brevioribus. Ovarium 3 lin. longum; stylus indivisus ovarium duplo superans, stigmate capitato. Capsulam non vidi. *California,* Fremont, 213! Hartweg, 1981!

Subgenus VIII. GONIOCARPA, *Baker. Bulbus* parvus, squamis

crassis cinctus. *Flores* solitarii vel pauci, foveolis obscuris æqualibus. *Stylus* apice distincte tricuspidatus. *Capsula* acute angulata.

43. F. DAGANA, *Turcz. Cat. Baic.* No. 1139; *Flor. Baic.* ii. 211; *Led. Ross.* iv. 148; *Traut. Imag.* 7, t. 1.—Imperialis dagana, *Turcz. Mosc. Bull.* 1838, i. 102.—F. chamarensis, *Turcz. MSS. olim.* Bulbus globosus 5–6 lin. crassus squamis paucis carnosis cinctus. Caulis monocephalus raro 2-cephalus 1–1½-pedalis, foliis 3–7, 2–6 ad medium verticillatis linearibus vel lanceolatis 2–3 poll. longis 2–6 lin. latis, supremo ad basin pedicelli cernui imposito. Perianthium campanulatum 12–18 lin. longum vinoso-purpureum distincte tessellatum, segmentis obtusis oblanceolato-oblongis supra basin obscure foveolatis. Stamina perianthio sub dimidium breviora, antheris obtusis filamentis glabris dodrante brevioribus. Ovarium 3–4 lin. longum; stylus 4–5 lin. longus stigmata falcata dimidio superans. Capsula quadrangulata 7–9 lin. longa acute angulata collo brevi turbinato, apice umbilicata. *Sibiria centralis meridionalis in pratis subalpinis,* Turczaninow!

44. F. ALBA, *Nuttall, Gen.* 222; *Schult. Syst.* vii. 399; *Kunth, Enum.* iv. 254.—Amblirion album, *Sweet, Hort. Brit.* 538. Bulbus parvus subsquamosus. Folia glaucescentia remotiuscula sparsa obliqua planiuscula linearia fere 2 poll. longa, 2 lin. lata. Flores 1–5 racemosi albi majusculi. Capsula obovoidea acute angulata. *Montes Scopulosi prope Fort Mandan,* Nuttall. (Non vidi. Deest in herbario Nuttalliano in hb. Mus. Brit., nisi forma albiflora *F. lanceolatæ* est.)

45. F. LANCEOLATA, *Pursh, Flora,* i. 230 (*excl. syn.*); *Hook. Flor. Bor. Am.* ii. 181, t. 193; *Kunth, Enum.* iv. 255 (*excl. syn.*); *Torrey, Bot. Mex. Bound.* t. 61.—F. esculenta, *Nuttall, MSS.*—Amblirion lanceolatum, *Sweet, Hort. Brit.* 538. Bulbus 9–12 lin. crassus globosus squamis crassis cinctus. Caulis 1–1½-pedalis 1–3-cephalus supra medium foliis 4–10 impositis lanceolatis 2–4 poll. longis 3–9 lin. latis in verticillis 1–2 3–4-foliatis dispositis vel superioribus sparsis. Pedicelli cernui foliis linearibus vel lanceolatis 1–2 poll. longis bracteati. Perianthium late campanulatum 12–15 lin. longum livide vinoso-purpureum sæpissime distincte tessellatum, segmentis oblanceolato-oblongis obtusiusculis 3–4 lin. latis ad basin nectario magno oblongo viridi foveolatis. Stamina perianthio triente breviora, antheris apiculatis 1½–2 lin. longis, filamentis 3–4plo brevioribus. Ovarium 3 lin. longum; stylus 2–3 lin. longus, stigmatibus falcatis brevior. Capsula quadrangulata 8–9 lin. longa et lata acute 6-angulata. *Insula Vancouver, Columbia britannica, Oregon, California,* Douglas! Lyall! Menzies! Hartweg, 2005! Geyer, 599! &c.—F. viridia, *Kellogg, Proc. Acad. Calif.* ii. 9, est forma floribus viridulis.—F.

mutica, *Lindl.* (*Bot. Reg.* sub t. 1663), *Kunth* (*Enum.* iv. 253), est forma elatior verticillis foliorum interdum 3, floribus 3–6. Forma adest in herbario Nuttalliano floribus albis.

46. F. PARVIFLORA, *Torrey, Bot. Whipple,* 90; *Wood, Proc. Phil. Acad.* 1868, 166. Bulbus ovoideus 6–9 lin. crassus squamis crassis bulbilliformibus cinctus. Caulis 1–1½-pedalis, apice racemosus, supra medium foliis circiter 9 linearibus 2–3 poll. longis impositis, infimis vel omnibus verticillatis. Racemus 5–20-florus. Pedicelli cernui 3–6 lin. longi foliis linearibus bracteati. Perianthium campanulatum 6 lin. longum vinoso-purpureum haud tessellatum viridulo suffusum, segmentis oblanceolatis rectis obtusis medio 1½–2 lin. latis prope basin nectario obscuro oblongo foveolatis. Stamina perianthio triente breviora, antheris 1½ lin. longis filamentis duplo brevioribus. Ovarium 2 lin. longum; stylus 1½ lin. longus, stigmatibus falcatis æquilongus. Capsula acute angulata. *California,* Bigelow!

47. F. ATROPURPUREA, *Nutt. Journ. Acad. Phil.* vii. 54; *S. Wats. Bot.* 40 *Parall.* 346. Bulbus depresso-globosus 6–9 lin. crassus squamis paucis carnosis crassis cinctus. Caulis 1–2-pedalis, apice 1–6-florus, foliis 12–20 supra medium impositis sparsis vel infimis oppositis ascendentibus linearibus 2–4 poll. longis 1–1½ lin. latis acutis vel obtusiusculis sæpe purpureo tinctis. Flores racemosi, secundi, foliis 1–2 poll. longis reliquis omnino similibus bracteati. Perianthium campanulatum 6–9 lin. longum saturate vinoso-purpureum viridulo obscure tessellatum, segmentis obtusis oblanceolatis 2–2½ lin. latis unguibus obscure foveolatis. Stamina perianthio triente breviora, antheris oblongis obtusis 1 lin. longis filamentis quadruplo brevioribus. Ovarium 2–3 lin. longum; stylus ovario et stigmatibus late falcatis æquilongus. Capsula erecta 6–12 lin. longa quadrangulata acute angulata apice umbilicata. *Montes Scopulosi Americæ borealis,* 5000–9500 *pedes,* Nuttall! Geyer, 273! Burke!

Subgenus IX. LILIORHIZA (*Kellogg*). *Bulbus* squamis pluribus crassis cinctus. *Stylus* apice stigmatoso tricuspidatus. *Flores* sæpissime racemosi, foveolis leviter impressis. *Capsula* obtuse angulata.—Sarana, *Fischer.*

48. F. RECURVA, *Benth. Pl. Hartweg.* 340; *Wood, Proc. Acad. Phil.* 1868, 167. Bulbus squamosus 9–12 lin. crassus. Caulis 1–2-pedalis, foliis 7–15 prope medium aggregatis linearibus ascendentibus acuminatis 3–4 lin. longis 2–3 lin. latis, 6–8 infimis in verticillis duobus dispositis, reliquis sparsis ab floribus remotis. Racemus laxus subsecundus 3–8-florus. Pedicelli 3–12 lin. longi, ascendentes vel apice cernui, foliis 2–3 poll. longis bracteati. Perianthium 12–18 lin. longum, anguste

campanulatum vinoso-purpureum utrinque distincte albido- vel flavido-tessellatum, segmentis oblanceolatis supra medium 2–3 lin. latis apice patulis acutiusculis, prope basin nectario obscuro carinali foveolatis. Stamina perianthio paulo breviora, antheris oblongis obtusis 1½ lin. longis filamentis 6plo brevioribus. Ovarium 3 lin. longum; stylus 6–7 lin. longus apice leviter tricuspidatus. Capsula obtuse angulata. *California*, Hartweg, 2007! Jeffray, 1061! Fremont, 348! 1846! Bigelow! *Nevada*, Hort. Leichtlin!

49. F. LILIACEA, *Lindl. Bot. Reg.* sub t. 1663; *Kunth, Enum.* iv. 254; *Wood, Proc. Acad. Phil.* 1868, 167.—Liliorhiza lanceolata, *Kellog, Proc. Acad. Calif.* ii. 46, t. 1. Bulbus 6–9 lin. crassus squamis bulbilliformibus pluribus cinctus. Caulis ½–1-pedalis 1–6-florus, foliis 9–15 prope basin aggregatis infimis sæpe oppositis vel ternis oblanceolatis carnosis 2–4 poll. longis 3–9 lin. latis. Flores cernui subsecundi, pedicellis ½–2 poll. longis, foliis reductis linearibus bracteati. Perianthium infundibuliformi-campanulatum 9–12 lin. longum, segmentis oblanceolato-oblongis albidis viridi-venosis haud tessellatis medio 3–4 lin. latis apice leviter cucullatis, dimidio inferiore foveola carinali obscura viridi præditis. Stamina perianthio duplo breviora, antheris apiculatis filamentis duplo brevioribus. Ovarium 3 lin. longum; stylus ovario subæquilongus, stigmata paulo superans. Capsula obovoidea 8–9 lin. longa obtuse angulata, collo brevi turbinato, apice umbilicata. *California et Nevada*, Douglas! Coulter, 739! Hartweg, 2006! &c.

50. F. BIFLORA, *Lindl. Bot. Reg.* sub t. 1663; *Kunth, Enum.* iv. 254. Bulbus parvus squamis bulbilliformibus cinctus. Caulis 6–9-pollicaris apice 1–2-cephalus, foliis 4–8 plerisque infra medium positis, infimis sæpissime oppositis lanceolatis vel oblongo-lanceolatis obtusiusculis 2–4 poll. longis medio 6–9 lin. latis, reliquis sparsis vel 2 inferioribus raro oppositis lanceolatis acutis. Pedicelli cernui foliis lanceolatis bracteati. Perianthium infundibuliformi-campanulatum 12–15 lin. longum, livide vinoso-purpureum vix tessellatum viridulo suffusum, segmentis oblanceolato-oblongis medio 3 lin. latis unguibus obscure carinali-foveolatis. Stamina perianthio dimidium breviora, antheris apiculatis 1½–2 lin. longis filamentis 2–3plo brevioribus. Ovarium 3–4 lin. longum; stylus 1½ lin. longus stigmatibus falcatis æquilongus. Capsula late obovoidea 6–9 lin. longa obtuse angulata. *California*, Douglas! Coulter, 737! 738! Bigelow! &c.

51. F. KAMTSCHATCENSIS, *Gawl. Bot. Mag.* sub t. 1216; *Hook. Flor. Bor. Am.* ii. 181, t. 193 A; *Kunth, Enum.* iv. 254; *Regel, Gartenf.* t. 173.—Lilium camtschatcense, *Linn. Sp.* 435; *Lambert, Linn. Trans.* x. t. 11.—L. affine, *Schult. Syst.* vii. 400 (*excl. syn.*).—L. quadrifoliatum, *E. Meyer, Rel. Hænk.* ii. 126.—Amblirion camtschat-

cense, *Sweet, Hort. Brit.* 538.—Sarana edulis, *Fisch. MSS.* Bulbus parvus globosus squamis crassis bulbilliformibus pluribus cinctus. Caulis $\frac{1}{2}$–$1\frac{1}{2}$-pedalis, apice 1–3-cephalus, foliis 10–15 supra medium impositis, inferioribus in verticillos 1–3 3–6-foliatos dispositis lanceolatis 2–4 poll. longis medio 6–12 lin. latis, superioribus minoribus sparsis. Pedicelli cernui 6–12 lin. longi foliis linearibus bracteati. Perianthium campanulatum 12–15 lin. longum livide vinoso-purpureum haud tessellatum segmentis oblongo-oblanceolatis obtusis 3–4 lin. latis unguibus carinato-foveolatis nigro-punctatis leviter papilloso-lamellatis. Stamina perianthio dimidium breviora, antheris flavis $1\frac{1}{2}$ lin. longis filamentis triplo brevioribus. Ovarium 3 lin. longum; stylus brevissimus, stigmatibus late falcatis duplo brevior. Capsula obovoidea 9–12 lin. longa obtuse angulata collo turbinato. *Siberia orientalis, Kamtschatka, Japonia, America borealis occidentalis e Sitka ad Californiam.*

Subgenus X. PETILIUM (*Linn.*). Bulbus magnus perennis squamosus. Flores multi umbellati. Stylus apice stigmatoso tricuspidatus. Genitalia elongata. Capsula angulis 6 acutis alatis. Nectarium crassum subrotundum margaritaceum, humore limpido copioso exudans.

52. F. IMPERIALIS, *Linn. Sp.* 435; *Mill. Dict.* No. 8; *Lam. Ill.* t. 245; *Bot. Mag.* t. 194 et 1215; *Red. Lil.* t. 131.—Imperialis canosa, *Mœnch, Meth.* 395.—Fritillaria corona-imperialis, *Gærtn. Fruct.* i. 64, t. 17. fig. 1.—Petilium imperiale, *Jaume St.-Hil. Familles,* i. 120; *Kunth, Enum.* iv. 246. Bulbus magnus globosus squamosus flavescens perennis odore vulpino. Caulis erectus strictus 3–4-pedalis viridis vel rubello maculatus pede supremo et prope basin nudus. Folia plurima conferta lanceolata viridia ascendentia, superiora acuminata medio 6–12 lin. lata, suprema sæpe 8–10 verticillata, infima opposita breviora latiora obtusiora. Flores ad apicem caulis plurimi semper umbellati cernui, foliis 8–20 linearibus erectis bracteati. Perianthium inodorum, flavum vel lateritium 21–30 lin. longum, segmentis oblanceolato-oblongis 9–15 lin. latis acutiusculis nullo modo tessellatis sed venis verticalibus pictis supra basin nectario crasso rotundato margaritaceo excavato foveolatis. Filamenta albida segmentis paulo breviora deorsum applanata dimidio inferiore valvata; antheræ luteæ 4–5 lin. longæ. Ovarium 5–6 lin. longum; stylus exsertus apice breviter tricuspidatus. Pedicelli fructiferi erecti. Capsula obovoidea 2 poll. longa, angulis 6 acutis alatis collo turbinato semipollicari. *Persia,* Kotschy, *326*! Aucher-Eloy, 5380! Loftus! *Afghanistan,* Griffith, 5865! *Kashmiria,* 7000–9000 *pedes,* Dr. Thomson! De formis vide *Miller, Dict.* Floret prima omnium ad finem Martii.

Species dubiæ.

53. F. JAPONICA, *Miquel, Ann. Mus. Lug. Bat.* iii. 158. "Caulis 5-pollicaris e bulbo piso vix majore basi pauco-squamoso nudus tenuis, apice foliis 4–5 approximatis lanceolatis utrinque acutis uniflorus. Pedicellus flori subæquilongus nutans. Perigonium ½ poll. longum dilatato-campanulatum, phyllis ovatis apice acutiusculis leviter recurvulis, extus pallide lilacinis? puncticulatis intus citrinis et sanguineo-punctatis. Antheræ flavæ elliptico-oblongæ. Stigma tripartitum lobis linearibus. Ad iconem libri Japonici determinavi" (Miquel, loc. cit.) *Japonia.*

54. F. MINUTA, *Boiss. & Noé, Diagn.* ser. 2, iv. 103. Caulis bipollicaris monocephalus, foliis 4, infimis sparsis lanceolatis acutiusculis 18 lin. longis 4 lin. latis, supremis oppositis anguste linearibus. Perianthium campanulatum 6 lin. longum segmentis oblanceolatis 2 lin. latis. Stamina perianthio paulo breviora, antheris oblongis luteis obtusis filamentis papillosis duplo brevioribus. Stylus ignotus. *In subalpinis Kurdistaniæ cum* F. kurdica, *Noé.*

55. F. SIBTHORPIANA, *Baker.*—Tulipa Sibthorpiana, *Smith, Flor. Græc.* iv. 25, t. 330; *Kunth, Enum.* iv. 225. Bulbus membranaceo-tunicatus depresso-globosus. Caulis semipedalis gracilis glaber monocephalus. Folia 2 prope medium caulis imposita remota ascendentia glaucescentia glabra lanceolata, inferius 4–4½ poll. longum, ad pollicem latum, supremum minus. Perianthium cernuum campanulatum flavum, vix unciam longum, segmentis oblanceolato-oblongis 3–4 lin. latis. Genitalia perianthio sub dimidium breviora, antheris apiculatis filamentis puberulis paulo brevioribus. Ovarium breve turbinato-triquetrum lutescens glabrum. Stylus ovario triplo longior clavatus ochroleucus undique pubescens, superne triqueter obtuse trilobus. *Asia minor prope Cressam,* Sibthorp. *Peloponnesus in monte humili saxoso prope Pilon, hodie Navarin,* Hawkins. Non vidi.

3. TULIPA, *Linn.*

Gen. no. 415; *Endl. Gen.* no. 109; *Kunth, Enum.* iv. 219; *Regel, Enumeratio specierum generis Tulipæ,* 1873; *Van Houtte, Flore des Serres,* sub t. 1223.—Orithyia, *D. Don in Sweet, Flow. Gard.* ser. ii. t. 336; *Endl. Gen.* no. 1092; *Kunth, Enum.* iv. 226.

Perianthium 6-partitum corollinum diutine campanulatum vel infundibuliformi-campanulatum, segmentis oblongis vel oblanceolato-oblongis vel obovato-oblongis caducis basi sæpe macu-

latis nunquam foveolatis nec tessellatis. *Stamina* 6 hypogyna subæqualia erecta, perianthio dimidium breviora, filamentis apice subulatis deorsum plus minus applanatis, antheris oblongis vel lineari-oblongis rectis basi profunde perforatis secus margines longitudinaliter dehiscentibus. *Ovarium* sessile, clavatum vel ampullaceum, triloculare, ovulis in loculo crebris horizontalibus; stylus sæpissime obsoletus, raro ovario æquilongus filiformis; stigmata 3 auriculata parva vel magna reflexa profunde canaliculata. *Capsula* oblonga vel obovoidea membranacea loculicide trivalvis, seminibus crebris discoideis; testa membranacea brunnea.—*Herbæ bulbosæ caulescentes foliis* 2–4 *carnoso-herbaceis loratis vel lineari-lanceolatis sæpissime glaucescentibus, floribus erectis raro ante anthesin cernuis speciosis, sæpissime solitariis, florescentia vernali.*

Subgenus Eutulipa. *Stylus obsoletus.*

Eriobulbi. *Bulbi tunicæ intus dense lanatæ. Pedunculus glaber lævis. Filamenta basi glabra.*

Segmenta perianthii omnia acuta .... 1. *oculus-solis.*
2. *sogdiana.*

Segmenta exteriora acuta, interiora apice rotundata cuspidata.

Folia inferiora lorato-lanceolata .... 3. *chrysantha.*
4. *montana.*
5. *maleolens.*
6. *præcox.*

Folia omnia anguste lineari-lorata .... 7. *Clusiana.*

Segmenta omnia obtusiuscula .... 8. *stellata.*
9. *Borszczowi.*

Gesnerianæ. *Bulbi tunicæ intus glabræ vel leviter adpresse pilosæ. Pedunculus glaber lævis. Filamenta basi glabra.*

Segmenta omnia acuminata .... 10. *acuminata.*
11. *retroflexa.*

Segmenta omnia acuta vel interiora cuspidata.
12. *bithynica.* 13. *Didieri.*
14. *campsopetala.* 15. *serotina.*

Segmenta omnia apice rotundata cuspidata vel truncata.
16. *Boissieri.* 17. *Gesneriana.*
18. *fulgens.* 19. *platystigma.*

SCABRISCAPÆ. *Bulbi tunicæ intus glabræ vel leviter adpresso-pilosæ. Pedunculus pubescens scabriusculus. Filamenta basi glabra.*

Segmenta omnia acuminata .... 20. *undulatifolia.*
21. *elegans.*

Segmenta omnia acuta, vel interiora apice rotundata cuspidata.
22. *bœotica.* 23. *strangulata.*
24. *suaveolens.* 25. *altaica.*

Segmenta omnia apice rotundata cuspidata.
26. *Eunanthiæ.* 27. *pubescens.*
28. *maculata.* 29. *Greigi.*

SAXATILES. *Perianthium utrinque puniceum. Filamenta basi barbata.*

Grandiflora segmentis obtusis............... 30. *saxatilis.*
Parviflora segmentis acutis .... 31. *pulchella.*

SILVESTRES. *Perianthium intus luteum vel albido-luteum, nunquam puniceum. Bulbi tunicæ sæpe apice pilosæ. Filamenta basi barbata.*

Perianthium extus violaceo-tinctum ...... 32. *violacea.*
Perianthium extus viridulo-tinctum.
Luteæ............... 33. *sylvestris.* 34. *fragrans.*
35. *Biebersteiniana.*
Pallidæ .... 36. *patens.* 37. *biflora.*
Perianthium extus rubello tinctum.
Luteæ............... 38. *humilis.* 39. *microgyna.*
40. *australis.* 41. *crispatula.*
42. *gallica.* 43. *Orphanidea.*
Pallidæ .... 44. *cretica.* 45. *Lownei.*

Subgenus ORITHYIA. *Stylus ovario æquilongus.*

Bulbus glaber.
Perianthium intus luteum .... 46. *uniflora.*
Perianthium intus albidum .... 47. *heterophylla.*
Bulbus lanosus .... 48. *edulis.*

1. T. OCULUS-SOLIS, *St. Amans, Rec. Soc. Agric. Agen.* i. 75; *Red. Lil.* t. 219; *Sweet, Flow. Gard.* ser. ii. t. 102; *Kunth, Enum.* iv. 222.—T. oculus-solis, var. typica, *Regel, Enum.* 46.—T. agenensis *Red. Lil.* 60.—T. acutiflora, *Poir. Encyc.* viii. 134. Bulbus ovoideus 15–18 lin. crassus stoloniferus tunicis castaneis intus dense griseolanosis. Caulis glaber flexuosus subpedalis. Folia 3–4 infra medium caulis imposita viridia glabra ascendentia, inferiora lorato-lanceolata acuta 9–12 lin. longa, infra medium 1½–2 poll. lata, superiora lanceolata. Perianthium inodorum erectum expansum infundibuliformi-campanulatum 2½–3 poll. longum, segmentis oblongis omnibus acuminatis, facie splendide coccineis, supra basin macula oblanceolata nigro-purpurea flavo cincta 12–15 lin. longa notatis, exterioribus medio 9–12 lin. latis, interioribus angustioribus paulo brevioribus sæpe minus acuminatis. Stamina segmentis subtriplo breviora, antheris flavis 6–9 lin. longis, filamentis glabris atro-purpureis. Ovarium cylindricum 8–9 lin. longum, stigmatibus 2 lin. latis. *Gallia meridionalis, Helvetia, Italia, post* præcocem 9–10 *dies florens.*

Var. LORTETII, *Baker.*—T. Lortetii, *Jord. Nouv. Tulip.* 3; *Ard. Fl. Alp. Marit.* 374. Minor, caule 6–8-pollicari, foliis crebrioribus, perianthii segmentis 18–20-lin., e medio 5–6 lin. latis, utrinque valde angustatis, macula basali oblanceolata nigricanti 6–8 lin. longa, staminibus perianthio subduplo brevioribus. *In cultis prope Massiliam,* Lortet!

Var. LYCICA, *Baker.* Caulis 6–8-pollicaris, foliis confertis, infimis 5–6 poll. longis. Perianthium 18–20 lin. longum, segmentis omnibus acutis 5–6 lin. latis, interioribus oblanceolato-oblongis apice subdeltoideis, macula basali nigricante 5–6 lin. longa, antheris filamenta atro-purpurea duplo superantibus. *Lycia prope Arsam,* Prof. E. Forbes!

Var. ALEPPICA, *Baker.*—Tulipa aleppica, *Boiss. & Hauss. Exsic.*; *Regel, Enum.* 50. Caulis subpedalis, foliis haud approximatis. Perianthium 2½–3 poll. longum, segmentis exterioribus oblongo-oblanceolatis acuminatis infra medium 9–10 lin. latis macula basali obscuriore vix flavo cincta, interioribus semipollicem brevioribus oblongo-spathulatis medio 8–9 lin. latis obtusiusculis. *In agris prope Aleppo,* Haussknecht! *Palæstina ad declivitates montium Hermon et Jebel Altarus,* Hayne.

2. T. SOGDIANA, *Bunge, Rel. Lehm.* 338; *Walp. Ann.* vi. 102; *Regel, Enum.* 52. Bulbus parvus ovoideus, tunicis intus dense griseolanosis. Caulis gracillimus flexuosus glaber 3–4-pollicaris, foliis duobus segregatis infra medium impositis recurvatis lanceolatis glabris acutis, majore 2–3 poll. longo, haud undulatis. Perianthium erectum flavum 7–8 lin. longum segmentis oblongis acutis medio 3–4 lin. latis,

unguibus spathulatis obscure ciliolatis. Stamina perianthio dimidium breviora, antheris 1½ lin. longis filamentis applanatis glabris duplo brevioribus. Ovarium 3 lin. longum ampullæforme, collo angustato, stigmatibus parvis. *In deserto Asiatico centrali arido inter Bucharam et Hermine, floret Martio,* Lehmann!

3. T. CHRYSANTHA, *Boiss. in Kotschy, Fl. Pers. Bor. Exsic. anno* 1846, No. 78.—T. Lehmanniana, *Merckl. in Bunge, Rel. Lehm.* 337; *Walp. Ann.* vi. 102.—T. undulata, *Jacquemont, MSS.* Bulbus ovoideus vel globosus 9–12 lin. crassus, tunicis firmis brunneis intus dense flavido-lanosis. Caulis floriferus glaber 3–4-pollicaris, foliis 3–4 glabris glaucis valde undulatis margine cartilagineo, infimis recurvatis vel ascendentibus lanceolatis 4–6 poll. longis 6–9 lin. latis, superioribus confertis angustioribus. Perianthium flavum vel aurantiacum vel extus rubello tinctum 12–15 lin. longum, segmentis oblongis medio 5–6 lin. latis acutis vel leviter obovatis subobtusis, unguibus obscure brunneo maculatis. Stamina perianthio bis triente breviora, antheris 3–5 lin. longis filamenta superantibus. Ovarium ampullæforme 4–5 lin. longum, collo angustato, stigmatibus parvis. *In deserto Asiatico centrali prope Bucharam,* Lehmann! *Persia borealis,* Kotschy! *Afghanistan,* Griffith, 5788! 5790! *Per totam Beloochistaniam superiorem ad pedes* 5000–6000 *ineunte Aprili florens, ad pedes* 9000 *ineunte Maio,* Stocks, 860! *Pentapotamia occidentalis,* Jacquemont, 150! Fleming! "Bulbi inter delicias estimantur, me judice castanearum æmuli. Iis avide vescuntur, tempore vernali, pueri et puellæ."—*Stocks.*

4. T. MONTANA, *Lindl. Bot. Reg.* t. 1106; *Schult. fil. Syst.* vii. 1684; *Kunth, Enum.* iv. 223; *Regel, Enum.* 54.—T. armeniaca, *Parkins. Parad.* 53, t. 8. Bulbus ovoideus 12–15 lin. crassus, tunicis brunneis membranaceis intus dense griseo-lanosis. Caulis 4–8-pollicaris, foliis 4 ab flore remotis glaucis glabris falcatis vel ascendentibus margine valde undulatis, infimis oblongo-lanceolatis 4–6 poll. longis infra medium 8–12 lin. latis, superioribus lanceolatis. Perianthium 1½–2 poll. longum campanulatum intus splendide puniceum, extus pallidius, segmentis oblongis acutis medio 8–12 lin. latis macula basali elongata vel brevi deltoidea nigricante flavo cincta notatis, interioribus paulo brevioribus magis obovatis cuspidatis vel obtusis. Stamina segmentis subtriplo breviora, antheris 4–6 lin. longis, filamenta atropurpurea superantibus. Ovarium cylindricum 6–7 lin. longum, stigmatibus 2 lin. latis. *Armenia,* 4000–5000 *pedes,* Huet du Pavillon! Zohrab! Calvert! *ad ripas Euphratis,* Chesney, 94! *Persia meridionalis,* Aucher-Eloy, 5374! Kotschy, 114! Haussknecht! *Arabia petræa,* Laborde! *Kurdistan,* Olgum! Garden! *Afghanistan,* Griffith, 5789!

Var. T. JULIA, *K. Koch, Linn.* xxii. 23; *Led. Fl. Ross.* iv. 134; *Regel,*

Enum. 48. Humilior, caule 2–3-pollicari, perianthio pollicari segmentis omnibus more *Gesnerianæ* oblanceolato-oblongis obtusis vel leviter cuspidatis. *In ditione Caucasica,* K. Koch, Szovits! *Turkestania,* Fedschenko teste Regel.

5. T. MALEOLENS, *Reboul, Tulip. Spec. App.* 1; *Schult. fil. Syst.* vii. 376; *Lindl. Bot. Reg.* 1839, t. 66; *Kunth, Enum.* iv. 222; *Reich. Ic. Germ.* t. 450.—T. oculus-solis, var. maleolens, *Regel, Enum.* 46, *excl. syn.* Bulbus ovoideus 12–15 lin. crassus stoloniferus tunicis intus dense griseo-lanosis. Caulis glaber subpedalis, foliis 3–4 infra medium impositis glaucescentibus undulatis, infimis lorato-lanceolatis 5–6 poll. longis 1–1½ poll. latis, superioribus lanceolatis. Perianthium campanulatum 1½–2 poll. longum, "odore injucundo sed levi," intus splendide rubro-sanguineum, extus pallidius, segmentis macula deltoidea atro-purpurea flavo cincta unguem totum occupante notatis, exterioribus oblongis acutis medio 9–12 lin. latis, interioribus paulo brevioribus apice latioribus cuspidatis. Stamina perianthio sub duas partes breviora, antheris 4½–5 lin. longis, filamentis atro-purpureis glabris æquilongis. Ovarium 6 lin. longum, stigmatibus 2–2½ lin. latis. *Italia, in ducatu Lucensi et agro Florentino, post* præcocem *florens,* Reboul! Parlatore! Var. VARIEGATA, *Sweet, Brit. Flow. Garden,* ser. ii. t. 153, est forma magna hortensis floribus rubro-purpureis flavis cupreis et pallide glaucis variegatis.

6. T. PRÆCOX, *Tenore, Flor. Neap.* i. 170, fasc. i. t. 32; *Schult. fil. Syst.* vii. 378, 1683; *Kunth, Enum.* iv. 223; *Sweet, Flow. Gard.* t. 187; *Reich. Ic.* t. 986–7; *Jord. Fragm.* i. 39, t. 5. fig. 3, *non Cav.* —T. Gesneriana, *Bot. Reg.* t. 380, *non L.*—T. oculus-solis, *Bot. Reg.* t. 204, 1143, 1419; *Reich. Ic.* t. 985?—T. bombycina flore rubro, *Parkins. Parad.* 53, t. 1 (1629).—T. oculus-solis, var. præcox, *Regel, Enum.* 47. Bulbus ovoideus 15–18 lin. crassus stoloniferus, tunicis castaneis intus dense griseo-lanosis. Caulis glaber flexuosus teres 12–18-pollicaris. Folia 3–5 infra medium caulis imposita glauca vel subviridia glabra, inferiora lorato-lanceolata 9–15 poll. longa infra medium 2–3 poll. lata acuta margine undulata, superiora minora lanceolata. Perianthium inodorum erectum campanulatum 2–3 poll. longum, segmentis late imbricatis dorso valde convexis facie splendide coccineis supra basin macula ampla oblonga vel oblanceolata nigropurpurea flavo cincta apice erosa 9–12 lin. longa notatis, exterioribus paulo longioribus ovato-oblongis acutis 12–15 lin. latis dorso pallidioribus apice puberulis, interioribus angustioribus oblongis paulo brevioribus apice obtusiusculis cuspidatis. Stamina perianthio ultra dimidium breviora antheris flavidis filamenta glabra atro-purpurea duplo excedentibus. Ovarium cylindricum 6–9 lin. longum, stigmatibus pubescentibus rubescentibus 2–2½ lin. latis. *Gallia meridionalis et*

Italia, ad finem Martii florens. In cultis insulæ Chios, Von Heldreich! *In pomariis Aleppo,* Haussknecht! *Palæstina, ad Magdalam,* Lowne, 400! (forma angustifolia). *Persia,* Sir. H. Willock.—T. PRÆCOX, *Reboul,* est forma segmentis angustioribus acutis foliis viridibus; T. RADDII, *Reboul,* segmentis angustioribus acutis foliis glaucis; T. FOXIANA, *Reboul* (et T. APULA, *Gussone in Ten. App.* v. 12; *Parl. Fl. Ital.* ii. 389; T. Strangwaysiana, *Reboul in herb. DC.*! T. oculus-solis, var. Strangwaysii, *Regel, Enum.* 47), segmentis latioribus, exterioribus 15–18 lin. latis, interioribus brevioribus obovatis obtusiusculis.

7. T. CLUSIANA, *Vent. in Red. Lil.* t. 37 (1802); *Bot. Mag.* t. 1390; *Sibth. & Sm. Flor. Græc.* t. 329; *Kunth, Enum.* iv. 223; *Moggridge, Cont. Ment.* t. 24.—T. præcox, *Car. Prælect.* 448 (1802), *non Ten.*—T. rubro-alba, *Brotero, Fl. Lus.* i. 520 (1804).—T. persica præcox, *Clus. Cur. Post.* 18.—T. persica, *Parkins. Parad.* 53, t. 6. Bulbus ovoideus 9–12 lin. crassus, stoloniferus, tunicis intus dense brunneo sericeo-pilosis. Caulis gracilis flexuosus glaber 12–18-pollicaris. Folia 4–5 distantia glauco-viridia glabra, omnia anguste lineari-lorata haud undulata acuminata, inferiora 6–12 poll. longa 6–9 lin. lata, superiora minora angustiora. Pedunculus 3-6-pollicaris. Perianthium erectum infundibuliformi-campanulatum 12–18 lin. longum, intus albidum fundo cærulescente, extus rubro tinctum, segmentis exterioribus lanceolatis acutis basi spathulatis 4–6 lin. latis, interioribus paulo brevioribus obtusiusculis. Stamina perianthio sub duos trientes breviora, antheris purpurascentibus 3–4 lin. longis filamentis glabris æquilongis. Ovarium 5–6 lin. longum, stigmatibus parvis. *Gallia meridionalis et Lusitania ad Byzantium et Græciam.*

8. T. STELLATA, *Hook. Bot. Mag.* t. 2762; *Schult. fil. Syst.* vii. 1684; *Kunth, Enum.* iv. 223.—T. Clusiana, var. stellata, *Regel, Enum.* 54. Bulbus ovoideus 9–12 lin. crassus, tunicis intus dense albido-lanosis. Caulis glaber gracilis 1–1½-pedalis. Folia 4–6 infra medium caulis imposita glabra glaucescentia canaliculata haud undulata, omnia anguste lineari-lorata, inferiora 9–12 poll. longa 4–6 lin. lata. Pedunculus 6–9-pollicaris. Perianthium infundibuliformi-campanulatum 1½–2 poll. longum, intus albidum fundo flavum, extus rubello tinctum, segmentis conformibus oblanceolato-spathulatis obtusiusculis vel interdum acutis infra medium 5–6 lin. latis. Stamina perianthio bis triente breviora, antheris filamentis glabris subæquilongis. Ovarium ampullæforme 5–6 lin. longum stigmatibus parvis. *Regio temperata Himalayæ occidentalis, alt.* 5000–8000 *pedes,* Lady Dalhousie! Strachey & Winterbottom! Dr. Thomson! &c. *Persia australis,* Kotschy, 99! Habitus omnino *T. Clusianæ*; differt floribus majoribus fundo flavis, segmentis omnibus oblanceolato-spathulatis obtusis.

9. T. Borszczowi, *Regel, Enum.* 48. Bulbus tunicis intus pilis tenuibus flexuosis fuscis sericeo-lanuginosis. Caulis glaber 8–16-pollicaris uniflorus. Folia 3–4 glauca glabra eximie undulata, marginibus cartilagineis, inferiora lorato-lanceolata, superiora angustiora, sæpissime recurvato-patentia. Perianthium campanulatum, rubrum vel luteum, segmentis omnibus obtusis vel leviter cuspidatis, basi macula atro-cærulea notatis. Filamenta sæpissime atro-cærulea antheris æquilonga. Stigma leviter trilobum. *In desertis Aralesibus,* Borszczow; *et in Turkestania prope Taschient,* Fedschenko et Kuschakewicz. (Non vidi.)

10. T. acuminata, *Vahl in Horn.Hort. Hafn.* i. 328 (1813).—T. stenopetala, *Mord. Del. Bon. Jard.* 1813, 269; *Lois. Herb. Amat.* t. 171.—T. cornuta, *DC. in Red. Lil.* t. 445; *Bot. Reg.* t. 127.—T. turcica, *Kunth, Enum.* iv. 221; *Regel, Enum.* 56, *non Roth.* Bulbus ovoideus 12–15 lin. crassus, tunicis castaneis intus glabris. Caulis 12–18-pollicaris flexuosus glaber. Folia sæpissime 3 infra medium caulis imposita glaucescentia glabra ascendentia, inferiora lorato-lanceolata 6–9 poll. longa margine undulata infra medium $1\frac{1}{2}$–2 poll. lata, superiora lanceolata acuminata. Pedunculus 6–9-pollicaris flexuosus glaber. Perianthium inodorum erectum 3–4 poll. longum saturate puniceum vel flavum vel album vel variegatum, segmentis conformibus lanceolatis longe caudato-acuminatis dimidio superiore valde undulatis ad apicem quarti inferioris 5–6 lin. latis. Stamina perianthio 5–6plo breviora, antheris flavis $4\frac{1}{2}$–5 lin. longis filamentis subæquilongis. Ovarium cylindricum 8–9 lin. longum, stigmatibus latitudine crassitiem ovarii duplo superantibus. *Stirps hortensis diu culta, per totum mensem Aprilis florens, verisimiliter ab* T. bithynica *orta.*—T. media, *Agardh, in Schult. fil. Syst.* vii. 379; *Kunth, Enum.* iv. 222, est stirps hortensis affinis floribus puniceis albo-variegatis segmentis apice glabris.

11. T. retroflexa, *Hort.* Bulbus, statura et folia omnino *T. Gesnerianæ.* Pedunculus glaber flexuosus 6–9-pollicaris. Perianthium splendide luteum concolor campanulatum $2\frac{1}{2}$–3 poll. longum, segmentis oblongis medio 12–15 lin. latis acuminatis dimidio superiore divaricato-falcatis valde undulatis. Stamina segmentis triplo breviora, antheris luteis 6–9 lin. longis filamenta luteola superantibus. Ovarium cylindricum 1 poll. longum, stigmatibus magnis undulatis latitudine crassitiem ovarii duplo superantibus. *Forma hortensis ad initium Maii florens.* Verisimiliter inter *Gesnerianam* et *acuminatam* hybrida.

12. T. bithynica, *Griseb. MSS.* Bulbus ovoideus 9–12 lin. crassus, tunicis sordide fuscis intus glabris. Caulis 3–6-pollicaris gracilis glaber. Folia 4–6 prope terram confertis glabris planis, infimis anguste

loratis 5-6 poll. longis medio 3–4 lin. latis ad apicem et basin angustatis. Perianthium inodorum, 9–15 lin. longum splendide rubrum, segmentis conformibus lanceolatis acutis medio 3–4 lin. latis. Stamina perianthio ultra dimidium breviora, antheris flavis 3–4 lin. longis filamentis nigrescentibus glabris æquilongis. Ovarium ampullæforme 5–6 lin. longum, stigmatibus minutis. *Montes Asiæ minoris* (*Bithynia, Cadmus, etc.*), Grisebach! Boissier! Aucher-Eloy, 2178! Elwes! Ad nives deliquescentes Junio floret.

13. T. Didieri, *Jord. Fragm.* i. 36, t. 5. fig. A; *Icones*, 8, t. 17; *non Gren. & Godr.*—T. Gesneriana, *Bellardi App. Fl. Ped.* 226, *non Linn.* Bulbus ovoideus 12–15 lin. crassus, tunicis castaneis intus parce adpresse pilosis vel glabris. Caulis strictus glaber 1–1½-pedalis, foliis 3–4 ascendentibus glaucis glabris undulatis, infra medium impositis, inferiore lorato-lanceolato 6–8 poll. longo, infra medium 15–18 lin. lato, superioribus lanceolatis. Perianthium campanulatum inodorum 1½–2 poll. longum, segmentis omnibus conformibus oblongis acutis medio 9–12 lin. latis, facie splendide puniceis, basi macula lata cæruleo-nigricante luteolo cincta unguem totum occupante notatis. Stamina perianthio plus quam duplo breviora, antheris 5–6 lin. longis, filamentis atro-purpureis glabris æquilongis vel superantibus. Ovarium cylindricum 6–7 lin. longum, stigmatibus flavis profunde canaliculatis crassitie ovarii duplo latioribus. *Sabaudia, in agris ad St. Jean de Maurienne,* Huguenin! *ad initium Maii florens* (cfr. Perrier in Bull. Bot. Soc. France, xiv. 95).—T. Fransoniana, *Parl.* (*Nuov. Gen.* 15; *Flor. Ital.* ii. 392), planta Florentina, ex descriptione non potui separare.

Var. T. mauriana, *Jord. Ic.* 9 (mauritiana *ad calcem tabulæ* 20). Folia latiora minus undulata vix glauca. Perianthium splendide coccineum, segmentis basi macula lata flava notatis unguem totum occupante, interioribus paulo brevioribus obtusiusculis. *Cum typo.*

Var. T. planifolia, *Jord. Ic.* 9, t. 19. Caulis flexuosus. Folia angustiora viridia minora haud undulata. Perianthium saturate coccineum, segmentis ima basi nigro maculatis, interioribus apice rotundatis, macula basali flavido cincta, florescentia paulo seriore. *Cum typo.*

Var. T. Billietiana, *Jord. Ic.* 8, t. 18. Folia undulata. Perianthium concolor saturate flavum, segmentis exterioribus acutis, interioribus apice rotundatis obtusiusculis. Stigmata majora. *Cum typo*; florescentia 8–10 dies serior. T. acutiflora, *DC. herb.*! est forma culta ad *T. Didieri* arcte affinis, ad initium Aprilis florens, pedunculo 5–8-pollicari, foliis supremis oblongo-lanceolatis 1–1½ poll. latis.

14. T. campsopetala, *Delaunay, Bon. Jard.* 1813, 269; *Lois. Herb. Amat.* t. 172.—T. Gesneriana, var.? campsopetala, *Kunth, Enum.* iv.

221. Bulbus ovoideus 15–18 lin. crassus, tunicis castaneis intus glabris. Caulis 1–1½-pedalis glaber. Folia 3–4 infra medium caulis imposita glauca canaliculata glabra haud undulata, inferiora lorato-lanceolata 6–9 poll. longa infra medium 2–2½ poll. lata. Pedunculus strictus glaber 6–9-pollicaris. Perianthium campanulatum suaveolens 2–2½ poll. longum, versicolor, luteo et rubro variegatum, segmentis exterioribus oblongis acutis medio circiter pollicem latis, interioribus obovatis obtusis vel cuspidatis. Stamina perianthio bis triente breviora, antheris 6–7 lin. longis filamenta glabra superantibus. Ovarium cylindricum 9–12 lin. longum, stigmatibus latitudine crassitiem ovarii duplo superantibus. *Stirps hortensis ad initium Maii florens.*

15. T. SEROTINA, *Reboul, Select. Sp. Tulip.* 6; *Bert. Fl. Ital.* iv. 85; *Kunth, Enum.* iv. 221. Bulbus ovoideus, tunicis intus glabris. Caulis 1–1½-pedalis glaber monocephalus. Folia 3 infra medium caulis imposita ascendentia canaliculata vix undulata, inferius lorato-lanceolatum 6–8 poll. longum 1 poll. latum, superiora angustiora lanceolata. Pedunculus semipedalis gracilis glaber. Perianthium 21–24 lin. longum splendide puniceum, segmentis basi vix maculatis, exterioribus oblongo-spathulatis acutis medio 7–8 lin. latis, interioribus latioribus obovatis cuspidatis. Stamina perianthio bis triente breviora, antheris 5–6 lin. longis filamenta glabra superantibus. Ovarium clavatum 6–7 lin. longum, stigmatibus latitudine crassitiem ovarii duplo superantibus. *In agro florentino, ad finem Maii florens postrema omnium,* Reboul! (Vidi in herb. DC.)

16. T. BOISSIERI, *Regel, Enum.* 48.—T. pulchella, *Boiss. in Roth. Pl. Exsic. non Fenzl.* Bulbum non vidi. Caulis glaber gracilis pedalis vel ultra. Folia 3, inferiora anguste lineari-lorata plana glabra 12–15 poll. longa 3–4 lin. lata margine ciliolata. Pedunculus glaber semipedalis. Perianthium erectum 14–15 lin. longum splendide rubrum, segmentis conformibus obovato-oblongis supra medium 7–8 lin. latis obtusis vel cuspidatis basi cuneatis obscure nigro maculatis. Stamina perianthio ultra dimidium breviora, antheris flavis 3 lin. longis filamentis glabris æquilongis. Ovarium 5 lin. longum, collo angustato, stigmatibus parvis. *Palæstina, prope Ramleh,* Dr. Roth!

17. T. GESNERIANA, *L. Sp.* 438 (*ex parte*); *Willd. Sp.* ii. 97; *Bot. Mag.* t. 1135; *Bot. Reg.* xxiv. t. 46, non t. 380; *Kunth, Enum.* iv. 221, *ex parte*; *Led. Ross.* iv. 134; *Sweet, Floral Guide,* t. 4 &c. (*tabulæ formarum cultarum* 47); *Regel, Enum.* 51. Bulbus ovoideus 12–15 lin. crassus, tunicis castaneis intus glabris vel leviter pilosis, bulbillis novis sessilibus. Caulis strictus glaber ½-pedalis, foliis 3–4 glaucis glabris ascendentibus infra medium impositis, inferioribus lorato-lanceolatis 5–6 poll. longis infra medium 12–18 lin. latis, supe-

rioribus lanceolatis. Perianthium erectum inodorum 12–24 lin. longum, campanulatum, segmentis splendide coccineis basi late purpureo-nigricante maculatis vel unguibus flavis vel luteis concoloribus rarius albidis, omnibus obovato-oblongis obtusis vel leviter cuspidatis supra medium 9–12 lin. latis raro angustioribus, exterioribus acutiusculis. Stamina perianthio subtriplo breviora, antheris 4–6 lin. longis filamenta glabra applanata atro-purpurea vel flava paulo vel triente superantibus. Ovarium cylindricum 5–6 lin. longum, stigmatibus magnis profundis flavis. *Rossia europæa centralis et meridionalis ab Tauria ad montes Altai et Songariam, Kurdistan,* Garden ! *Armenia,* Zohrab !—T. ARMENA, *Boiss. Diagn.* ser. 2, iv. 99; *Regel, Enum.* 53, ab montibus Armeniæ alt. 6000–7000 pedes, *Huet du Pavillon* ! non potui segregare.—T. SCHRENKI, *Regel, Enum.* 521, e Songaria et Turkestania, est verisimiliter forma sylvestris floribus 12–15 lin. longis infundibuliformi-campanulatis. Plantam dictam sylvestrem Florentinam (T. SPATHULATA, *Bert. Ital.* iv. 85.—T. Gesneriana, *Reboul, Sp.* 6; *Parl. Fl. Ital.* ii. 396; *Strangways in Bot. Reg.* xxiv. t. 46) non potui distinguere. Plantam banaticam ad *Gesnerianam* refertam non vidi; helvetica (*Vallesia inter segetes ad Sion,* Muret ! Boissier !) sub nomine *T. Didieri* vel *T. oculi-solis* sæpe divulgata est GESNERIANA vel forma arcte affinis. Habemus *oculum-solis* veram ex eodem loco, a Thomasio lectam. Fons varietatum plurimarum serotinarum hortorum; sed characteres datæ omnino ad plantam vere sylvestrem pertinent.

18. T. FULGENS, *Hort.* Bulbus; statura et folia omnino *T. Gesnerianæ.* Pedunculus glaber 8–9-pollicaris. Perianthium campanulatum, splendide coccineum, fundo flavum, 2–2½ poll. longum, segmentis conformibus oblongis medio 10–12 lin. latis, basi cuneatis, apice rotundatis distincte cuspidatis. Stamina perianthio bis triente breviora, antheris flavis 5–6 lin. longis filamenta paulo superantibus. Ovarium cylindricum 8–9 lin. longum, stigmatibus latitudine crassitiem ovarii haud duplo superantibus. *Forma hortensis ad initium Maii florens, verisimiliter inter* Gesnerianam *et* suaveolentem *hybrida.*

19. T. PLATYSTIGMA, *Jord. Billot, Annot.* 32; *Icones* 8, t. 16.—T. Didieri, *Gren. Flor. Franc.* iii. 177, *non Jord.* Bulbus ovoideus pollicem crassus, tunicis castaneis intus parce pilosis. Caulis flexuosus glaber 1–1½-pedalis, foliis 3–4 infra medium impositis glaucescentibus facie glabris ciliolatis valde undulatis, inferiore lorato-lanceolato 6–8 poll. longo medio 1½–2 poll. lato, superioribus lanceolatis. Perianthium campanulatum 2–2½ poll. longum, lilacino-roseum odore violaceo, segmentis oblongis basi cuneatis medio 12–13 lin. latis apice falcatis obtusis vel cuspidatis, unguibus macula parva cærulescente oculo lutescente notatis. Stamina perianthio supra

dimidium breviora, antheris violaceis filamenta glabra superantibus. Ovarium cylindricum, stigmatibus magnis profundis undulatis latitudine crassitiem ovarii duplo superantibus. *In Alpibus Galliæ austro-orientalis prope Guillestre,* Roux.

20. T. UNDULATIFOLIA, *Boiss. Diagn.* v. 57. Bulbus ignotus. Caulis vix semipedalis glaucescens pubescens. Folia inferiora lanceolata semipedalia arcuato-recurvata longe acuminata margine undulata deorsum pollicem lata, facie brevissime hirta, suprema multo minora. Perianthium erectum 1½–2 poll. longum, splendide rubrum, segmentis ovatis longe acuminatis apice hirtulis exterioribus paulo latioribus, interioribus paulo brevius abruptiusque acuminatis, basi macula nigra late flavo cincta notatis. Filamenta glabra antheris duplo breviora. *In herbosis pinguibus ad pedem rupium in summo monte Tartali, supra Smyrnam, in Maio florens,* Boissier. (Non vidi.)

21. T. ELEGANS, *Hort.* Bulbus ovoideus 12–15 lin. crassus, tunicis castaneis, intus subglabris. Caulis 1–1½-pedalis leviter pubescens, foliis 3–4 infra medium impositis glaucis facie leviter ciliatis, infimis lorato-lanceolatis 8–10 poll. longis infra medium 2 poll. latis. Pedunculus flexuosus 6–9-pollicaris leviter griseo-pubescens. Perianthium 3–3½ poll. longum, splendide coccineum fundo flavum, segmentis omnibus caudatis, exterioribus lanceolatis ad apicem tertii inferioris pollicem latis, interioribus medio 13–14 lin. latis utrinque attenuatis. Stamina perianthio ultra duos trientes breviora, antheris violaceis 6–7 lin. longis filamenta glabra superantibus. Ovarium cylindricum 8–10 lin. longum, stigmatibus flavis latitudine crassitiem ovarii sesqui superantibus. *Stirps hortensis ad finem Aprilis florens, verisimiliter inter* acuminatam *et* suaveolentem *hybrida.*—T. ODORATISSIMA, *Vis. Ort. Bot. Pad.* 149; *Walp. Ann.* i. 849, est verisimiliter forma affinis ad *suaveolentem* magis accedens.

22. T. BŒOTICA, *Boiss. & Held. Diagn.* ser. 2, iv. 99; *Regel, Enum.* 50.—T. strangulata et oculus-solis, *Held. Exsic. olim.* Bulbus ovoideus 1 poll. crassus, tunicis castaneis, intus glabris. Caulis 6–9-pollicaris flexuosus pubescenti-scabriusculus. Folia 3–4 infra medium caulis imposita glabra margine valde undulata, inferiora lorato-lanceolata 5–6 poll. longa infra medium 12–15 lin. lata, superiora lanceolata. Pedunculus 2–3-pollicaris, griseo-pubescens. Perianthium campanulatum saturate rubrum 1½–2 poll. longum, segmentis conformibus oblongis acutis vel acuminatis medio 6–8 lin. latis basi macula angusta elongata nigricante flavo cincta notatis. Stamina perianthio sub duos trientes breviora, antheris luteis 5–6 lin. longis filamenta glabra paulo superantibus. Ovarium 6–7 lin. longum, stigmatibus latitudine crassitiem ovarii sesqui superantibus. *Bœotia et*

Eubœa ad finem Martii florens, Von Heldreich! Inter *oculum-solis* et *strangulatam* medium tenens; petala et macula prioris; bulbus et scapus posterioris.

23. T. STRANGULATA, *Reboul, Spec. Tulip.* 6; *Schult. fil. Syst.* vii. 375, 1682; *Kunth, Enum.* iv. 221; *Parl. Fl. Ital.* ii. 399.—T. scabriscapa, var. strangulata, *Fox-Strangways, Bot. Reg.* t. 1990. fig. 3; *Bert. Fl. Ital.* iv. 86. Bulbus ovoideus stoloniferus 12–15 lin. crassus, tunicis castaneis intus glabris. Caulis subpedalis teres pubescens scabriusculus. Folia 3–5 infra medium caulis imposita ascendentia glauca undulata obscure ciliolata facie glabra, inferiora lorato-lanceolata 6–8 poll. longa infra medium 1½–2 poll. lata, superiora minora lanceolata. Pedunculus 5–6-pollicaris. Perianthium erectum odore levi mellifero campanulatum 1¾–2 vel in hortis 3 poll. longum splendide coccineum, segmentis apice flore expanso falcatis, exterioribus oblongis acutis medio 9–12 lin. latis, interioribus magis obovatis apice rotundatis cuspidatis, omnibus basi macula lata brevi cæruleo-nigricante interdum flavo marginata notatis. Stamina perianthio triplo breviora, antheris 6–7 lin. longis filamenta glabra superantibus. Ovarium cylindricum 6–8 lin. longum, stigmatibus latitudine crassitiem ovarii sesqui superantibus. *In agro Florentino ad finem Aprilis et per Maiam florens.*—T. NEGLECTA, *Reboul, Select. Spec.* 7 (T. scabriscapa, var. Hawardeniana, *Bert. Ital.* iv. 86.—T. scabriscapa, var. primulina, *Fox-Strangways, Bot. Reg.* t. 1990, fig. 4) est forma floribus flavis concoloribus; et T. BONAROTIANA, *Reboul, Nonnul. Spec. Tulip.* 7 (T. scabriscapa, var. Buonorottiana, *Fox-Strangways, Bot. Reg.* t. 1990, fig. 2) et T. VARIOPICTA, *Reboul, Select. Sp. Tulip.* 7; *Parl. Fl. Ital.* ii. 399 (var. Reboulíana, *Bert. Fl. Ital.* iv. 87; var. mixta, *Fox-Strangways, Bot. Reg.* t. 1990, fig. 1) sunt formæ floribus rubro-luteo variegatis.

24. T. SUAVEOLENS, *Roth, Cat.* i. 45; *Willd. Sp.* ii. 97; *Bot. Mag.* t. 839; *Red. Lil.* t. 111; *Herb. Amat.* t. 98; *Kunth, Enum.* iv. 220; *Flore des Serres*, t. 1223.—T. dubia pumilio, *Clus. Hist.* 148, *cum icone.*—T. præcox, *Parkins, Parad.* 46 (*descrip.* 49, tab. 4 *varietatum*). Bulbus ovoideus 12–18 lin. crassus, tunicis castaneis intus glabris vel leviter adpresse pilosis, bulbis novellis sessilibus. Caulis strictus pubescens 3–6-pollicaris. Folia 3–4 prope basin caulis conferta glauca secus faciem griseo-pubescentia, inferiora lorato-lanceolata 6 poll. longa infra medium 1–1½ poll. lata, superiora lanceolata multo minora. Pedunculus 2–3-pollicaris conspicue griseo-pubescens. Perianthium erectum suaveolens 1½–2½ poll. longum, splendide coccineum vel flavum vel variegatum, segmentis conformibus oblongis acutis medio 6–9 lin. latis utrinque angustatis. Stamina perianthio triplo breviora, antheris luteis 4–6 lin. longis filamenta glabra superantibus. Ovarium 6–7 lin. longum cylindricum, stigmatibus latitudine crassitiem

ovarii sesqui superantibus. *Ad ripas Maris Caspici cum* T. Gesneriana, Pallas! *In ditione Tanaica,* Henning; *Tauria,* Steven. In hortis diutissime culta sub nomine "Duc Van Thol;" in Anglia per mensem totum Martii et initium Aprilis florens.—T. HORTULANORUM, *Wender, in Otto & Dietr. Gartenzeit.* vi. 71; *Walp. Ann.* i. 849, ex descriptione, non potui segregare. Cum *T. strangulata* jungit cl. Regel.

25. T. ALTAICA, *Pallas, Spreng. Syst. Veg.* ii. 63; *Schult. fil. Syst.* vii. 385; *Led. Ic.* t. 134; *Flor. Ross.* iv. 135; *Kunth, Enum.* iv. 226; *Regel, Enum.* 56. Bulbus ovoideus 9–12 lin. crassus, tunicis brunneis intus glabris. Caulis 6–9-pollicaris flexuosus pubescens. Folia 2–3 infra medium caulis imposita undulata glauca membranaceo-marginata facie pubescentia, inferiora lorato-lanceolata 5–6 poll. longa infra medium 9–12 lin. lata, superiora angustiora. Pedunculus 2–3-pollaricaris. Perianthium erectum infundibuliformi-campanulatum 15–18 lin. longum luteum immaculatum, segmentis oblongis vel oblanceolato-oblongis conformibus acutis vel acutiusculis 4–6 lin. latis dorso viridulo vel raro rubello tinctis. Stamina perianthio subduplo breviora, antheris luteis 3–5 lin. longis filamenta glabra applanata superantibus vel brevioribus. Ovarium 5–6 lin. longum, collo angustato, stigmatibus parvis longitudine crassitiem ovarii haud superantibus. *Siberia centralis meridionalis ad montes Altai, alt.* 1000–6000 *pedes, &c.* Ledebour! Gebler! Semenow! &c., *Turkestania,* Korolkow.

26. T. EUNANTHIÆ, *Orphan. in Boiss. Diagn.* ser. 2, iv. 100; *Regel, Enum.* p. 50. Bulbus mediocris, tunicis fuscis glabris. Caulis pubescenti-scabriusculus. Folia 3 prope medium caulis imposita undulata margine scabrida patenti-recurvata, inferiora lorato-lanceolata, suprema angustiora acuminata. Perianthium rubrum, segmentis obovatis basi attenuatis apice breviter cuspidatis macula basilari obovata nigricante flavido cincta notatis. Antheræ filamenta glabra paulo superantes. Stigma crassitiem ovarii triplo superans, *Laconia in regione media montis Malevo,* Orphanides. (Non vidi.)

27. T. PUBESCENS, *Willd. Enum. Suppl.* 17; *Sweet, Flow. Gard.* t. 78. —T. suaveolens β. pubescens, *Kunth, Enum.* iv. 220.—T. suaveolens β. latifolia, *Bot. Mag.* t. 2388. Bulbus ovoideus 12–15 lin. crassus, tunicis intus glabris vel obscure adpresse pilosis. Caulis teres strictus glaucus leviter pubescens 1–1½-pedalis. Folia 3–4 infra medium scapi imposita glauca ascendentia glabriuscula, inferiora lorato-lanceolata 6–9 poll. longa infra medium 1½–2 poll. lata. Pedunculus 6–9-pollicaris leviter griseo-pubescente scabriusculus. Perianthium campanulatum leviter suaveolens 2–2½ poll. longum, rubrum, luteum, album vel versicolor, segmentis exterioribus oblongis acutis vel cuspidatis medio 12–15 lin. latis, interioribus obovatis apice rotundatis

leviter cuspidatis. Stamina perianthio subtriplo breviora, antheris 5–6 lin. longis filamenta glabra superantibus. Ovarium cylindricum 8–9 lin. longum, stigmatibus latitudine crassitiem ovarii duplo superantibus. *Stirps hortensis longe et late cognita ad initium Aprilis et per totum mensem florens, verisimiliter inter* Gesnerianam *et* suaveolentem *hybrida, fons formarum plurimarum elatiorum præcocium sub nominibus* Pottebakker, Claramond, Bride of Haarlem, Tournesol, *etc., cultarum.*

28 T. MACULATA, *Hort.* Bulbus, caulis et folia *T. pubescentis.* Perianthium campanulatum, 2–2½ poll. longum, segmentis conformibus obovatis cuspidatis supra medium pollicem et ultra latis, splendide coccineis unguibus cæruleo-nigricantibus zona transversali luteo marginatis. Stamina perianthio triplo breviora, antheris purpureis filamenta glabra superantibus. Stigmata parva *T. suaveolentis. Stirps hortensis ad finem Maii florens, fortasse hybrida altera inter* Gesnerianam *et* suaveolentem, *petalis et floratione seriore prioris, stigmatibus parvis et pedunculo puberulo posterioris.*

29. T. GREIGI, *Regel, Enum.* 49. Bulbus tunicis apice intus strigosis. Caulis 2–8-pollicaris puberulus uniflorus. Folia 3–4 undulata eximie cartilagineo marginata, glabra vel margine ciliolata vel superiora facie minute puberula, caulem sæpissime superantia, in planta viva maculis oblongis fuscis notata, inferiora ovato-lanceolata, superiora angustiora. Pedunculus pubescenti-scabriusculus. Perianthium aperte campanulatum, segmentis obovato-cuneatis 1½–2 poll. longis obtusis cuspidatis, purpureis vel rubris basi macula oblonga nigrescente flavo cincta notatis vel luteis basi macula nigrescente sublineari notatis. Filamenta antheris subæquilonga. Stigma leviter trilobum. *Turkestania,* Sewerzow, Fedschenko, &c.

30. T. SAXATILIS, *Sieb. in Pl. Cret. Exsic. ex parte*; *Reich. Ic. Crit.* t. 396; *Schult. fil. Syst. Veg.* vii. 385; *Kunth, Enum.* iv. 226; *Regel, Enum.* 45. Bulbum non vidi. Caulis pedalis et ultra glaber 1–2-cephalus. Folia 3–4 infra medium caulis imposita, inferiora ad pedem longitudine attingentia lorato-lanceolata 15–18 lin. lata glabra margine undulata, superiora lanceolata acuminata. Perianthium 2 poll. longum saturate rubrum, segmentis omnibus obovatis spathulatis obtusis obscure cuspidatis, exterioribus 8–9, interioribus 9–12 lin. latis. Genitalia perianthio triplo breviora. Antheræ 3 lin. longæ filamentis applanatis basi dense barbatis duplo breviores. Ovarium 6–7 lin. longum collo angustato, stigmatibus parvis. *Creta ad cap. Maleca* Sieber!

31. T. PULCHELLA, *Fenzl, in Kotschy, Reise Cilic.* 379.—T. sylvestris var. pulchella, *Regel, Enum.* 43.—T. alpina, *J. Gay in Balansa, Pl. Orient. Exsic.* 1855. Bulbus ovoideus 6–9 lin. crassus, tunicis intus apice tenuiter pilosis. Caulis 2–3-pollicaris flexuosus glaber mono-

cephalus. Folia 2 raro 3 ad basin scapi conferta falcata patentia lorato-lanceolata glabra canaliculata, inferiora 3–4 poll. longa infra medium 6–8 lin. lata. Pedunculus 1–1½-pollicaris. Perianthium 10–12 lin. longum, infundibuliformi-campanulatum, utrinque rubrum, segmentis acutis oblanceolato-oblongis medio 3–4 lin. latis unguibus spathulatis haud maculatis conspicue ciliatis. Stamina perianthio duplo breviora, antheris oblongis 1½ lin. longis, filamentis supra basin dense ciliatis triplo brevioribus. Ovarium 4 lin. longum, ampullaceum, stigmatibus parvis. *Asia Minor*; *regio alpina montium Tauri, mense Julio florens*, Kotschy, 506! Balansa!

32. T. VIOLACEA, *Boiss. et Buhse, Reise Transcauc.* 211. Bulbus glabriusculus, tunicis fuscis. Caulis ad medium foliis 3 congestis linearibus glabris acutis canaliculatis 4–5 poll. longis inferne circiter semipollicem latis instructus. Perianthium 15–16 lin. longum, segmentis extus violaceis basi atro-cæruleis elliptico-lanceolatis acutis basi subunguiculatis apice ciliato-barbatis, exterioribus glabris, interioribus ad unguem dense ciliato-barbatis. Antheræ violaceæ, filamentis supra basin angustato-stipitatam dilatatis, basi dilatata ciliatis, dein superne sensim angustatis glabris. *Persia borealis*, Buhse. (Non vidi.)

33. T. SYLVESTRIS, *Linn. Sp.* 438; *Engl. Bot.* t. 63; *Flor. Dan.* t. 375; *Curt. Lond.* t. 19; *Red. Lil.* t. 165; *Bot. Mag.* t. 1202 (*excl. syn.*); *Schk. Handb.* t. 93; *Kunth, Enum.* iv. 224; *Reich. Germ.* t. 983, *non M. Bieb. nec Desf.* Bulbus ovoideus 6–9 lin. crassus stoloniferus, tunicis brunneis intus apice brunneo-sericeis. Caulis 9–15-pollicaris flexuosus glaber. Folia sæpissime 3 prope basin scapi imposita ascendentia plana glaucescentia glabra canaliculata acuta, inferiora anguste lorata 6–12 poll. longa, medio 6–9 lin. lata, superiora minora. Pedunculus 6–9-pollicaris sæpissime monocephalus ante anthesin apice cernuus. Perianthium flavum inodorum campanulatum 1½–2 poll. longum extus viridulum, segmentis omnibus acutis, exterioribus oblanceolato-oblongis 4–6 lin. latis, interioribus latioribus magis obovatis. Stamina perianthio triplo breviora, antheris luteis 4–5 lin. longis filamentis concoloribus basi leviter applanatis dense barbatis æquilongis vel brevioribus. Ovarium ampullæforme 6–7 lin. longum, collo angustato, stigmatibus parvis latitudine crassitiem ovarii haud superantibus. *Ab Anglia et Scandinavia ad Caucasum, Tauriam, Siciliam, et Hispaniam.*—T. TURCICA, *Roth, Catal.* i. 45; *Sweet, Brit. Flow. Gard.* t. 186, *non Kunth.*—T. REPENS, *Fisch. Sweet, Brit. Flow. Gard.* ser. ii. t. 97; *Kunth, Enum.* iv. 224.—T. FLORENTINA *hort.* et T. MARSHALLIANA, *Andrz.* sunt formæ grandifloræ; et T. APENNINA, *Clus. Hist.* 150; T. BOLONIENSIS FLORE LUTEO, *Parkins. Parad.* 53, t. 2; et T. PUMILA, *Moench, Hort. Marb.* 301, sunt formæ bifloræ.

34. T. FRAGRANS, *Munby, Bull. Bot. Sc. France*, xiii. 256. Bulbus ovoideus 6–9 lin. crassus, tunicis brunneis intus glabris. Caulis ½–1-pedalis monocephalus glaber. Folia 3 prope medium caulis conferta ascendentia glaucescentia lineari-lorata acuta, inferiora 6–8 poll. longa 4–6 lin. lata. Perianthium diutine erectum flavum infundibuliformi-campanulatum 12–18 lin. longum insigniter suaveolens, segmentis omnibus acutis oblanceolato-oblongis medio 4–6 lin. latis. Stamina perianthio ultra dimidium breviora, antheris luteis 3 lin. longis filamentis base dense barbatis brevioribus. Ovarium 5–6 lin. longum, collo angustato, stigmatibus parvis. *Algeria prope Oran*, Munby! Balansa, 211! Ad *sylvestrem* arctissime accedit. *V. v. in Hort. Kew.*

35. T. BIEBERSTEINIANA, *Schult. fil. Syst.* vii. 382; *Kunth, Enum.* iv. 224.—T. sylvestris, *Pallas, Iter*, i. 148, *in Bieb. Flor. Taur.* i. 270, *non L.*—T. sylvestris β. minor, *Led. Fl. Ross.* iv. 136.—T. sylvestris β. Biebersteiniana, *Regel, Enum.* 42, *excl. syn.*—T. pumila, *Tausch. Bot. Zeit.* 1829, *Ergbl.* 47, *non Moench.*—T. Celsiana, *Henning, Mém. Soc. Mosc.* vi. 70, *non DC.* Bulbus ovoideus 6–9 lin. crassus, tunicis sordide brunneis intus apice dense lanosis. Caulis glaber flexuosus semipedalis monocephalus. Folia 2–3 infra medium scapi imposita ascendentia glaucescentia canaliculata glabra, inferiora 5–6 poll. longa 3–6 lin. lata. Pedunculus 3–4-pollicaris ante anthesin cernuus. Perianthium infundibuliformi-campanulatum 12–15 lin. longum, intus flavum, extus viridi suffusum, segmentis omnibus acutis medio 3–6 lin. latis, interioribus latioribus. Stamina perianthio duplo breviora, antheris 1½–2 lin. longis, filamentis applanatis basi barbatis dimidio vel triente brevioribus. Ovarium ampullæforme 3–4 lin. longum collo angustato, stigmatibus parvis. *Rossia europæa austro-orientalis, Caucasus, Persia.*—T. THIRKEANA, *K. Koch in Tchih. Asia Minor*, ii. 532 (*nomen solum*).—T. tricolor, *K. Koch, olim, non Led.* ex Bithynia, legit Dr. Thirke, non vidi.—T. SYLVESTRIS var. TURKESTANICA, *Regel. Enum.* 43, est forma affinis vel eadem in Turkestania lecta.

Var. AURANTIACA, *Baker.* Elatior subpedalis, foliis 5, 3 superioribus anguste linearibus. Perianthium 13–14 lin. longum, extus et intus luteo-aurantiacum, nullo modo viridulo tinctum, segmentis latioribus obtusiusculis. *Persia prope Ispahan*, Aucher-Eloy, 5373.

36. T. PATENS, *Agardh in Schult. fil. Syst. Veg.* vii. 384 (1829).—T. tricolor, *Led. Fl. Alt.* ii. 33 (1830); *Ic. Ross.* t. 135; *Bot. Mag.* t. 3887; *Kunth, Enum.* iv. 225.—T. sylvestris, var. tricolor, *Led. Fl. Ross.* iv. 136; *Regel, Enum.* p. 42, *excl. syn.* Bulbus ovoideus 6–9 lin. crassus, tunicis brunneis apice intus obscure pilosis. Caulis 3–9-pollicaris gracilis glaber flexuosus debilis monocephalus rarissime 2-cephalus. Folia 2–3 prope medium scapi imposita ascendentia glabra

canaliculata lineari-lorata, inferiora 3–5 poll. longa 3–6 lin. lata. Pedunculus 2–3-pollicaris ante anthesin cernuus. Perianthium infundibuliformi-campanulatum 9–12 lin. longum intus albido-flavescens fundo luteo extus obscure viridulum, segmentis acutis oblongo-lanceolatis medio 3–4 lin. latis. Stamina perianthio dimidium breviora, antheris luteis 1½ lin. longis filamentis basi barbatis triente vel dimidio brevioribus. Ovarium 3 lin. longum collo angustato stigmatibus parvis. *Siberia centralis meridionalis ad montes Altai, Songariæ, &c., alt.* 1000–5000 *pedes.*

37. T. BIFLORA, *Linn. Suppl.* 196; *Pallas, Iter,* iii. 584; *Lindl. Bot. Reg.* t. 535; *Regel, Enum.* 44.—Orithyia biflora, *Kunth, Enum.* iv. 227.—T. sylvestris, var. biflora, *Led. Ross.* iv. 136. Bulbus ovoideus 9–12 lin. crassus, tunicis intus superne parce lanosis. Caulis 3–6-pollicaris gracilis glaber, raro 1-, sæpe 2–3-, raro 4–5-cephalus. Folia 2–3, supremum sæpe ad furcam caulis impositum, patentia plana canaliculata glaucescentia glabra lineari-lorata 3–6 poll. longa 3–6 lin. lata. Perianthium infundibuliformi-campanulatum 6–9 lin. longum intus albidum fundo luteum extus viridulo tinctum, segmentis acutis oblanceolato-oblongis medio 3–4 lin. latis. Stamina perianthio dimidium breviora, antheris oblongis 1½ lin. longis filamentis applanatis basi ciliatis ½–⅔ brevioribus. Ovarium ampullæforme 3–4 lin. longum, in stylum brevissimum vel subnullum angustatum, stigmatibus parvis. *Ab Caucaso et ditione Volgensi ad Turcomaniam et montes Altai.*

38. T. HUMILIS, *Herbert, Bot. Reg.* 30; *Misc.* 30.—T. Buhseana, *Boiss. Diag.* ser. 2, iv. 98.—T. biflora, var. Buhseana, *Regel, Enum.* 44. Bulbus 6–9 lin. crassus, tunicis brunneis apice sericeis. Caulis 2–3-pollicaris gracilis glaber monocephalus. Folia 3–4 prope medium caulis conferta linearia canaliculata haud undulata, majora 3–4-pollicaria. Pedunculus 1–2-pollicaris ante anthesin apice subcernuus. Perianthium infundibuliformi-campanulatum 9–12 lin. longum luteum extus rubellum, segmentis omnibus acutis oblanceolato-oblongis medio 4–6 lin. latis, interioribus distincte latioribus. Antheræ 2 lin. longæ, filamentis leviter applanatis basi barbatis brevioribus. Ovarium ampullæforme 4–5 lin. longum, stigmatibus parvis. *Montes Persiæ borealis, alt.* 5000–7000 *pedes,* Kotschy, 105! Buhse, Szovits.

39. T. MICROGYNA, *Baker.* Bulbus globosus semipollicem crassus, tunicis teneris brunneis intus apice leviter pilosis. Caulis 4–5-pollicaris gracilis glaber monocephalus. Folia 4 infra medium caulis imposita omnia linearia, infimum canaliculatum obtusiusculum 2½–3 poll. longum 3 lin. latum, superiora minora acuminata. Pedunculus gracillimus 2½–3-pollicaris. Perianthium infundibuliforme 11–12 lin. longum, intus luteum, extus rubello tinctum, segmentis oblanceolato-spathulatis acutis vel acuminatis medio 2–3 lin. latis unguibus ciliatis.

Stamina perianthio dimidium breviora, antheris oblongis 1 lin. longis filamentis deorsum barbatis quadruplo brevioribus. Ovarium 2½ lin. longum, staminibus duplo brevius, ampullaceum, apice substylosum. stigmatibus parvis. *Mount Ida*, Aucher-Eloy in herb. DC.

40. T. AUSTRALIS, *Link in Schrad. Journ.* ii. 317 (1799).—T. Celsiana, *DC. in Red. Lil.* t. 38 (1802); *Schult. fil. Syst.* vii. 382; *Kunth, Enum.* iv. 224; *Reich. Ic. Germ.* t. 984.—T. transtagana, *Brot. Fl. Lus.* i. 519 (1804).—T. Breyniana, *Bot. Mag.* t. 717.—T. maculata, *Roth, Nov. Sp.* 196; *Kunth, Enum.* iv. 225.—T. sylvestris, *Gouan et Desf. non Linn.*—T. narbonensis et lusitanica, *Parkins. Parad.* 152 (1629). Bulbus ovoideus 6–9 lin. crassus, post anthesin stoloniferus, tunicis castaneis intus glabris. Caulis ½–1-pedalis sæpissime monocephalus gracilis glaber. Folia 2–3 infra medium scapi conferta glabra glaucescentia canaliculata, inferiora lanceolata 6–9 poll. longa 6-12 lin. lata, superiora angustiora. Pedunculus 3–6-pollicaris ante anthesin cernuus. Perianthium 9–15 lin. longum infundibuliformi-campanulatum luteum extus rubellum, segmentis oblanceolato-oblongis acutis medio 3–4 lin. latis apice leviter puberulis. Stamina perianthio dimidium breviora, antheris luteis 3–4 lin. longis, filamentis leviter applanatis basi barbatis subæquilongis. Ovarium ampullæforme 5–6 lin. longum collo angustato, stigmatibus parvis. *Lusitania, Hispania, Gallia meridionalis, et Sabaudia.*—T. ALPESTRIS, *Jord. et Four. Brev.* 120, ex Alpibus Delphinati, dicitur differre perianthii basi contractiore, laciniis omnibus basi ciliatis, exterioribus superne minus angustatis, antheris fuscis haud luteis, ovario superne fusco nec viridi, cauleque folia haud superante.

41. T. CRISPATULA, *Boiss. et Buhse, Reise Transcauc.* 211. Bulbus tunicis fuscis teneris intus parce lanosis. Caulis vix semipedalis supra medium foliis 2–3 instructus. Folia lanceolata canaliculata acuminata margine undulato-crispula ciliolata recurvata 2–3 poll. longa 4–5 lin. lata. Perianthium 10–11 lin. longum, luteum, extus roseum, segmentis acutis oblanceolato-oblongis 3 lin. latis, interioribus basi ciliatis. Antheræ flavæ. Filamenta antheris subæquilonga basi subangustata ciliata flava, superne longe attenuata. *Persia inter Damgan et Bischin*, Buhse. (Non vidi.)

42. T. GALLICA, *Lois. Gall.* i. 241; *Herb. Amat.* t. 160; *Kunth, Enum.* iv. 224; *Gren. Fl. Franc.* iii. 178.—T. acrocarpa, *Jord. MSS.* Bulbus ovoideus 6–9 lin. crassus tunicis sordide brunneis apice tenuiter sericeis. Caulis gracilis ½–1-pedalis glaber. Folia 2–3 prope basin scapi imposita ascendentia plana glaucescentia glabra canaliculata anguste lorata, inferiora 6–9 poll. longa 6–9 lin. lata. Pedunculus 4–9-pollicaris ante anthesin apice cernuus. Perianthium infundibuliformi-campanulatum flavum leviter odorum 12–18 lin. longum extus

obscure rubellum, segmentis omnibus acutis, exterioribus oblanceolato-oblongis 3–5 lin. latis, interioribus latioribus magis obovatis. Stamina perianthio bis triente breviora, antheris luteis 2½–3 lin. longis filamentis basi valde applanatis lanceolatis leviter barbatis brevioribus. Ovarium ampullæforme 5–6 lin. longum, collo attenuato, stigmatibus parvis. *Galloprovincia ad Draguignan, Hyères, &c.*, Perreymond! Dr. Franklin Gould! per mensem Aprilis florens.

43. T. ORPHANIDEA, *Boiss. in Orph. Pl. Græc. Exsic.* no. 843; *Held. in Regel, Gartenfl.* 1862, 309, t. 373. figs. 1, 2.—T. Orphanidesii *hort. Angl.*—T. Minervæ et atheniensis, *Orphan. MSS.* —T. sylvestris, var. Orphanidea, *Regel, Enum.* pp. 43. Bulbus ovoideus 9–12 lin. crassus stoloniferus, tunicis intus apice brunneo-sericeis. Caulis ½–1-pedalis monocephalus glaber. Folia 2–3 infra medium caulis conferta lineari-lorata acuta plana glaucescentia canaliculata glabra, inferiora 4–6 poll. longa 6–9 lin. lata. Perianthium infundibuliformi-campanulatum, 18–21 lin. longum, luteum, extus rubellum, segmentis omnibus acutis apice obscure puberulis, exterioribus medio 4–5, interioribus medio 6–7 lin. latis. Stamina perianthio bis triente breviora, antheris luteis 3 lin. longis filamentis valde applanatis basi barbatis sub dimidium vel trientem brevioribus. Ovarium ampullæforme 6–7 lin. longum collo angustato, stigmatibus parvis. *Græcia in monte Hymetto etc. ad finem Martii florens*, Orphanides; Von Heldreich! Inter *sylvestrem* et *australem* medium tenens.—T. GRISEBACHIANA, *Pantosek, Oest. Bot. Zeit.* 1873, p. 255, e Herzegovina, ex descriptione, est verisimiliter planta affinis.

44. T. CRETICA, *Boiss. & Held. Diagn.* xiii. 19.—T. sylvestris, var. cretica, *Regel, Enum.* p. 43 *ex parte*. Bulbus ovoideus 6–8 lin. crassus, tunicis sordide brunneis intus apice tenuiter adpresse pilosis. Caulis 2–3-pollicaris gracilis glaber monocephalus. Folia 2–3 prope basin caulis conferta falcata patentia glabra canaliculata, inferiora interdum lanceolata 2–3 poll. longa infra medium 5–6 lin. lata, superiora vel omnia linearia 2–3 lin. lata acuminata. Pedunculus 1–1½-pollicaris. Perianthium infundibuliforme 8–12 lin. longum, intus albidum, extus rubro tinctum, segmentis acutis oblanceolato-oblongis medio 3–5 lin. latis, interioribus distincte latioribus. Stamina perianthio duplo breviora, antheris oblongis 1 lin. longis filamentis dense barbatis 3–4plo brevioribus. Ovarium ampullaceum 3–4 lin. longum, stigmatibus parvis. *Creta in omnibus montibus excelsis*, Sieber! Von Heldreich!

45. T. LOWNEI, *Baker*. Bulbum non vidi. Caulis glaber 2-cephalus profunde furcatus 2–3-pollicaris. Folia 2 prope furcam caulis conferta patentia falcata glabra canaliculata lanceolata 3–4 poll. longa supra basin 6–12 lin. lata. Pedicelli 1½–2-poll. apice recti vel subcernui.

Perianthium 9–14 lin. longum infundibuliformi-campanulatum intus albido-luteum, extus valde rubello tinctum, segmentis acutis oblanceolato-oblongis medio 3–4 lin. latis. Stamina perianthio duplo breviora, antheris oblongis 1 lin. longis filamentis albidis basi leviter barbatis 4plo brevioribus. Ovarium ampullæforme 4–5 lin. longum, collo angustato, stigmatibus parvis. *Palæstina ad cacumen montis Hermon*, Lowne!

Var. HAYNEI, *Baker*. Caulis uniflorus, floribus minoribus (8–9 lin. longis) pallidioribus, segmentis basi intus cite luteis, antheris paulo longioribus. *Palæstina ad Libanum*, Hayne!

46. T. UNIFLORA, *Besser in Herb. Kew*.—Ornithogalum uniflorum, *Linn. Mant.* 62; *Willd. Sp.* ii. 111.—Gagea uniflora, *G. Don, Loud. Hort. Brit.* 134; *Schult. fil. Syst. Veg.* vii. 553.—Orithyia uniflora, *D. Don in Sweet, Brit. Flow. Gard.* ser. ii. t. 336. Bulbus ovoideus 6–9 lin. crassus, tunicis membranaceis brunneis intus glabris secus basin caulis productis. Scapus 3–6-pollicaris gracilis flexuosus glaber monocephalus. Folia 2 prope basin scapi contigua patentia lineari-lorata glaucescentia glabra canaliculata 3–5 poll. longa 3–6 lin. lata haud undulata. Pedunculus 1–2-pollicaris ante anthesin cernuus. Perianthium infundibuliforme 8–12 lin. longum, intus luteum, extus viridulo tinctum, segmentis oblanceolato-oblongis obtusis vel acutiusculis supra medium 3–4 lin. latis. Stamina perianthio dimidium vel in floribus minoribus trientem breviora. Antheræ luteæ 1–1½ lin. longæ, filamentis glabris basi obscure barbatis ¾–⅘ brevioribus. Ovarium ampullaceum 2–3 lin. longum, in stylo erecto subæquilongo attenuatum, stigmatibus parvis. *Siberia centralis meridionalis ad montes Altai, &c.*—ORITHYIA NUTANS, *Trautt. Mag.* 15, t. 10, est forma grandiflora floribus diutine nutantibus segmentis obtusis.—O. OXYPETALA, *Kunth, Enum.* iv. 227 (Tulipa heteropetala, *Led. Ic. Ross.* t. 85), est forma angustifolia perianthii segmentis acutis medio 2½ lin. latis.

47. T. HETEROPHYLLA, *Baker*.—Orithyia heterophylla, *Regel, Enum. Semenow*, 117. Bulbus glaber, tunicis fuscis. Scapus erectus glaber uniflorus 2–3-pollicaris. Folia 2 subopposita erecto-patentia glabra scapo breviora, inferum ovato-lanceolatum, superum lineari-lanceolatum. Perianthium intus albidum, extus virescens, segmentis erectis oblongo-lanceolatis obtusiusculis. Stamina pistillum paulo superantia, filamentis glabris basi dilatatis, antheris lineari-oblongis triplo brevioribus. Ovarium oblongo-ampullaceum, stylo ovario æquilongo. *Alatau transiliensis, alt.* 7000–8000 *pedes*, Semenow.

48. T. EDULIS, *Baker*.—Orithyia edulis, *Miquel, Ann. Mus. Lug. Bat.* iii. 158.—O. oxypetala, *A. Gray, Bot. Morrow*, 322; *Miquel, loc. cit. non Kunth*. Bulbus ovoideus 6–9 lin. crassus, tunicis brunneis teneris

intus dense lanosis. Caulis gracillimus semipedalis glaber debilis 1–2-cephalus. Folia sæpe 6, 2 parva linearia prope apicem rami opposita vel alterna, inferiora lineari-lorata glabra canaliculata flaccida 9–12 poll. longa 3–4 lin. lata, flores longe superantia. Perianthium infundibuliforme 10–16 lin. longum, intus albidum, extus rubellum, venis verticalibus rubellis distinctis, segmentis lanceolatis acutis vel acutiusculis medio 2½–3 lin. latis. Stamina perianthio subduplo breviora, antheris oblongis 1½ lin. longis, filamentis glabris albidis triplo brevioribus. Ovarium ampullæforme 2 lin. longum, in stylum longiorem angustatum, stigmatibus parvis. *Japonia prope Yokohama et Nagasaki*, Morrow et Williams, Oldham, 945! Dickens!

Species dubia.

49. T. OXYPETALA, *Stev. Taur.* 333. "Glabra, caule trifolio, foliis margine subundulatis anguste marginatis, inferioribus ovato-lanceolatis, filamentis glaberrimis anthera duplo brevioribus, perigonii foliolis omnibus subæqualiter acutatis, interioribus erectis, exterioribus apice patentibus. Flos roseus debile odorus. Antheræ reliquis majores fere semiunciales; filamenta basi dilatata apice livida. A *T. Clusiana* differt foliis duplo latioribus." *Tauria, in campestribus rarior.*

4. ERYTHRONIUM, *Linn.*

Gen. no. 414; *Endl. Gen.* no. 1090; *Kunth, Enum.* iv. 217.

Perianthium corollinum 6-partitum, segmentis subæqualibus lanceolatis circa ovarium diutine conniventibus, supra ovarium arcte reflexis, marcescentibus, interioribus sæpe basi callosis et auriculatis. *Stamina* hypogyna vel obscure perigyna perianthio dimidium breviora, filamentis applanatis apice acuminatis, antheris elongatis basifixis basi profunde perforatis secus margines dehiscentibus. *Ovarium* breviter stipitatum oblongum triloculare, ovulis in loculo pluribus biseriatis; stylus filiformis interdum leviter declinatus, apice stigmatoso breviter tricuspidatus vel indivisus. *Capsula* obovoidea membranacea obtuse angulata loculicide trivalvis, seminibus turgidis oblongis pendulis apice raphe excurrente in caudiculam producta strophiolatis, testa lutescente rugulosa.—*Herbæ bulbosæ, caulibus supra basin foliis 2 oppositis latis carnosis instructis, pedunculis elongatis nudis, floribus speciosis sæpissime solitariis.*

Stylus apice stigmatoso, sæpissime vel semper tricuspidatus.
Gerontogea floribus roseo-purpureis, interdum albis. 1. *dens-canis.*
Americana occidentalis floribus flavis .... 2. *grandiflorum.*
Americana orientalis floribus albidis............ 3. *albidum.*
Stylus apice stigmatoso indivisus.
Grandiflora antheris elongatis .... 4. *americanum.*
Parviflora antheris minutis .... 5. *propullans.*

1. E. DENS-CANIS, *L. Sp.* 437 (*excl.* γ); *Jacq. Austr.* t. 9; *Red. Lil.* t. 94; *Bot. Mag.* t. 5; *Reich. Germ.* t. 973; *Sweet, Flow. Gard.* ser. ii. t. 71; *Kunth, Enum.* iv. 217.—E. maculatum, *Lam. Gall.* iii. 286. —E. ovatifolium, *Poir. Encyc.* viii. 660. Bulbus ovoideo-cylindricus membranaceo-tunicatus, bulbillis sessilibus. Folia 2 opposita supra basin caulis imposita ovato- vel oblongo-lanceolata 2–4 poll. longa $\frac{3}{4}$–$1\frac{1}{2}$ poll. lata glauca purpureo maculata in petiolum canaliculatum 1–2 poll. longum angustata. Pedunculus 3–4-pollicaris ebracteatus. Perianthium cernuum solitarium roseum vel violaceo-purpureum, raro album, 1–$1\frac{1}{4}$ poll. longum, segmentis lanceolatis supra basin valde reflexis medio 3–5 lin. latis prope basin brunneo maculatis, interioribus tuberculis 4 patelliformibus callosis auriculatis. Stamina perianthio duplo breviora, antheris filamentis paulo brevioribus. Stylus 5–6 lin. longus apice leviter tricuspidatus. Capsula obovoidea obtuse angulata stipitata. *Per Europam centralem et meridionalem totam.*—E. LONGIFOLIUM, *Miller* (*Dict.* no. 2), *Sweet* (*Flow. Gard.* ser. ii. t. 676), *Kunth* (*Enum.* iv. 217), est forma hortensis foliis longioribus acutioribus, floribus majoribus (2 poll. longis), cuspidibus stigmatosis profundioribus apice emarginatis.

Var. SIBIRICUM, *Fisch. & Meyer, Ind. Sem. Petr.* vii. 47; *Led. Ross.* iv. 134; *Kunth, Enum.* iv. 668.—E. altaicum, *Besser in Herb. Kew.* Robustius 6–9-pollicare, floribus majoribus $1\frac{1}{2}$–2 poll. longis, callis segmentorum internorum protuberantia lineari transversali medio subcrenata connexis, cuspidibus stigmatosis apice emarginatis. *Siberia ad montes Altai*, &c.

Var. JAPONICUM, *Baker.* Perianthium violaceo-purpureum 12–15 lin. longum, segmentis basi macula nigricante distincta tridentata notatis. Stylus 7 lin. longus ovarium 3–4plo superans apice leviter tricuspidatus. *Japonia, prope Hakodadi*, Hodgson!

2. E. GRANDIFLORUM, *Pursh, Flora,* i. 231; *Schult. fil. Syst.* vii. 374; *Lindl. Bot. Reg.* t. 1786; *S. Wats. Bot.* 40 *Parall.* 348. Bulbus elongato-ovoideus 6–9 lin. crassus, tunicis membranaceis sursum productis. Folia oblongo-oblanceolata 4–5 poll. longa 9–18 lin. lata acuta vel obtusiuscula basi in petiolum brevem angustata imma-

culata impunctata. Pedunculus 3–6-pollicaris monocephalus apice cernuus. Perianthium flavum 12–18 lin. longum, segmentis lanceolatis acutis 2–3 lin. latis ex apice ovarii reflexis immaculatis, interioribus basi obscure auriculatis. Stamina perianthio dimidium vel ultra breviora, antheris flavis 3–4 lin. longis filamentis brevioribus. Stylus 5–6 lin. longus apice indivisus vel distincte tricuspidatus. Capsula anguste obovoidea 9–12 lin. longa obtuse angulata. *Montes Scopulosi Americæ borealis et California.*

Var. GIGANTEUM, *Hooker, Flor. Bor. Am.* ii. 182.—E. giganteum, *Lindl. Bot. Reg.* sub t. 1786; *Bot. Mag.* t. 5714.—E. maximum, *Douglas, MSS.*—E. speciosum, *Nuttall, MSS.*—Elatior foliis latioribus, floribus majoribus 1–6 flavis, segmentis 3–6 lin. latis. *Montes Scopulosi, alt.* 6000–10000 *pedum, ad Californiam et insulam Vancouver.*

Var. REVOLUTUM, *Hook.*—E. revolutum, *Smith, Rees's Cyclop.* Pedunculus subpedalis. Perianthium solitarium roseo-purpureum 15–18 lin. longum. Stylus breviter tricuspidatus. *Nootka,* Menzies!

Var. MULTIFLORUM, *Torrey, Bot. Whipple,* 90. Flores 1–15 lilacini parvi 6–7 lin. longi. Stamina multo minora. Stylus 3 lin. longus apice obscure trilobatus. *California,* Bigelow!

3. E. ALBIDUM, *Nuttall, Gen.* i. 233; *Schult. fil. Syst.* vii. 374; *Kunth, Enum.* iv. 218; *Gray, Man.* edit. 5, 533. Bulbus ovoideus 12–15 lin. crassus stoloniferus. Caulis 6–9-pollicaris. Folia oblongo-lanceolata 4–6 poll. longa, 1–1½ poll. lata, subacuta, paullulum maculata impunctata. Perianthium solitarium subcernuum albidum vel leviter cærulescens, 12–18 lin. longum, segmentis lanceolatis supra basin reflexis 2–3 lin. latis, interioribus exauriculatis. Stamina perianthio dimidium breviora, antheris filamentis dimidio brevioribus. Stylus 4–5 lin. longus apice leviter tricuspidatus. *Civitates Fœderatæ Americæ borealis a Canada ad Wisconsin et Illinois.* Adest, teste A. Gray *loc. cit.*, ad Lacum Superiorem varietas floribus flavis ad *E. grandiflorum* vergens.—E. BRACTEATUM, *Bigelow* (*in Beck, Bot.* 365), *Kunth* (*Enum.* iv. 219), est verisimiliter forma nemorosa hujus speciei foliis magnis oblanceolatis, flore parvo, pedunculo prope apicem bractea minuta lineari instructo. Exempla originalia Boothiana a Vermont adsunt in hb. Kew. et D.C. (fl. yellow, fide Beck)

4. E. AMERICANUM, *Smith, Rees's Cyclop.*; *Gawl. Bot. Mag.* t. 1113; *Bigelow, Med. Bot.* iii. 151, t. 58; *Kunth, Enum.* iv. 218.—E. denscanis γ, *Linn. Sp.* 437; *Red. Lil.* t. 194.—E. aquatile, *Salisb. Hort. Trans.* i. 331.—E. lanceolatum, *Pursh, Flora,* i. 230. Bulbus ovoideus stoloniferus. Folia oblongo-lanceolata 4–6 poll. longa acuta basi in petiolum angustata pallide viridia purpureo et albido punctata et maculata. Pedunculus monocephalus 4–6-pollicaris. Perianthium

flavum extus interdum purpurascens 12–18 lin. longum, segmentis lanceolatis obtusis 2–4 lin. latis, sæpissime supra basin fusco maculatis, interioribus auriculatis. Stamina perianthio dimidium breviora, antheris linearibus 3 lin. longis. Stylus 6 lin. longus clavatus e basi ad apicem subintegrum sensim incrassatus. Capsula obovoideo-subglobosa brevissime stipitata. *America borealis orientalis a Canada ad Floridam et Texas.*—E. CAROLINIANUM, *Walt.* (*Carol.* 122), *Kunth* (*Enum.* iv. 219), est forma foliis vix oppositis.—E. NUTTALLIANUM, *Schult. fil.* (*Syst.* vii. 1681), *Kunth* (*Enum.* iv. 218), *Regel* (*Gartenflora*, t. 695. fig. 1, 2), est forma auriculis perianthii segmentorum internorum obsoletis.

5. E. PROPULLANS, *A. Gray, Amer. Nat.* 1871, 298, t. 74. Bulbus parvus ovoideus profunde hypogæus prope apicem partis subterraneæ caulis stolonem propullans. Folia oblongo-lanceolata 2–3 poll. longa leviter maculata acuta basi longe angustata. Pedunculus gracillimus 2–3 poll. longus, monocephalus. Perianthium 5–6 lin. longum roseo-purpureum, segmentis lanceolatis acutis $1\frac{1}{2}$ lin. latis basi flavo-maculatis exauriculatis nullo modo callosis. Stamina inæqualia, longiora perianthio triente breviora, antheris oblongis $\frac{1}{2}$ lin. longis. Stylus indivisus $2–2\frac{1}{2}$ lin. longus ovarium superans. Ovarium obovoideum ovulis in loculo 4–6. *Minnesota*, Mrs. Hedges ! Miss Darlington !

5. LLOYDIA, *Salisb.*

Gen. 51 ; *Reich. Fl. Germ.* 102 ; *F. Nees, Gen. Flor. Germ.* iv. t. 19 ; *Endl. Gen.* no. 1094 ; *Kunth, Enum.* iv. 243.—Nectarobothrium, *Led. Fl. Alt.* ii. 36.—Rhabdocrinum, *Reich. Conspect.* no. 1352.—Antherici sp., *Linn.*—Phalangii sp., *Poir.*—Gageæ sp., *Schult. fil.*, &c.

Perianthium 6-partitum diutine infundibuliforme, segmentis oblanceolatis marcescentibus rectis interdum unguibus obscure foveolatis. *Stamina* 6 hypogyna perianthio distincte breviora, filamentis filiformibus rectis, antheris oblongis basifixis basi profunde perforatis secundum marginem totum dehiscentibus. *Ovarium* sessile oblongo-cylindricum triloculare, ovulis in loculo crebris biseriatis ; stylus rectus brevis, apice stigmatoso capitatus. *Capsula* membranacea obovoidea loculicide trivalvis obobtuse angulata, seminibus parvis subcompressis dimidiato-oblongis, testa tenui castanea.—*Herbæ humiles bulbosæ, foliis duris graminoideis, floribus albidis parvis.*

Subgenus EULLOYDIA. *Bulbus obliquus subrhizomatosus. Segmenta unguibus foveolatis.*

Species sola .... 1. *serotina.*

Subgenus GAGEOPSIS*. *Bulbus rectus globosus. Segmenta unguibus haud foveolatis.*

Folium radicale solitarium 3–4 lin. latum ...... 2. *triflora.*

Folium radicale sæpissime solitarium 1–1½ lin. latum. 3. *rubro-viridis.*

Folia radicalia pauca 1 lin. lata .... 4. *græca.*

1. L. SEROTINA, *Reich. Germ. Excurs.* 102; *Kunth, Enum.* iv. 244; *Eng. Bot.* edit. 3, t. 1521.—Anthericum serotinum, *L. Sp.* 444; *Eng. Bot.* t. 793.—Phalangium serotinum, *Poir. Enc.* v. 241; *Red. Lil.* t. 270.—Gagea serotina, *Ker, Journ. Scien.* ii. 180.—Ornithogalum striatum, *Willd. Sp.* ii. 112.—Nectarobothrium striatum, *Led. Alt.* ii. 36.—Ornithogalum altaicum, *Laxm. Nov. Comm. Act. Petrop.* viii. 530, t. 7. fig. 1.—L. alpina, *Salisb.*—L. longiscapa, *Hook. Ic.* t. 834. —L. himalensis, *Royle, Ill.* 388, t. 93. fig. 2; *Kunth, Enum.* iv. 672. Bulbus obliquus subrhizomatosus perennis tunicis membranaceis cinctus apice longe productis. Folia radicalia 2–4 linearia dura convoluta caulem superantia vel breviora. Caulis sæpissime monocephalus, interdum 2–3-cephalus, 3–9-pollicaris, foliis 3–4 parvis linearibus instructus. Perianthium expansum erectum 6–8 lin. longum albidum basi luteo-purpureum, segmentis oblanceolatis obtusis 1½–2 lin. latis viridulo-purpureo venosis, unguibus nectario viridi obscuro glabro foveolatis. Stamina perianthio triente breviora, antheris minutis oblongis. Stylus ovario æquilongus. Capsula obovoidea 3 lin. longa obtuse angulata. *Ab montibus Cambriæ et Delphinati ad Siciliam, Himalayas, et Montes Scopulosos Americæ borealis, distributio latissima omnium Liliacearum.*—NECTAROBOTHRIUM REDOWSKIANUM, *Schlecht. & Cham. Linnæa,* vi. 585, est forma gracilis segmentis perianthii vix ultra lineam latis.—LLOYDIA SICULA, *Huet du Pav. Pl. Sic. Exsic.* No. 247, est forma elatior gracilis hujus speciei. De vegetatione vide Wydler, Regensb. Flora, 1859, p. 33, et Irmisch, Bot. Zeit. 1863, pp. 161–169, t. 6.

2. L. TRIFLORA, *Baker.*—Ornithogalum triflorum, *Led. Mém. Acad. Petrop.* v. 529; *Ic.* t. 379.—Gagea triflora, *Schult. fil. Syst.* vii. 511; *Kunth, Enum.* iv. 142; *Led. Ross.* iv. 141; *Maxim. Prim. Amur.* 278. Bulbus solitarius pisi magnitudine latere circa basin bulbillis pluribus tunica communi inclusis instructus. Folium radicale solitarium 6–9 poll. longum 3–4 lin. latum glabrum e medio utrinque attenua-

* Ab *Gageis* floribus corymbosis bracteis segregatis, inferioribus caulinis, præsertim differt perianthii segmentis albidis, venis purpurascentibus haud in carinam confertis.

tum. Caulis debilis semipedalis apice corymbosus 2–8-florus, infra vel ad furcam unam corymbi foliis 1–2 linearibus 2–3 poll. longis 3–4 lin. latis instructus. Pedicelli erecti 9–15 lin. longi medio vel basi foliis minutis linearibus 3–6 lin. longis bracteati. Perianthium infundibuliforme albidum 4½–5 lin. longum, segmentis oblanceolatis 1½ lin. latis venis 3–5 verticalibus distantibus viridibus unguibus haud foveolatis. Stamina perianthio sub dimidium breviora, antheris minutis subrotundis. Stylus 1½ lin. longus, ovario æquilongus. Capsulam non vidi. *Siberia orientalis, Kamtschatka, insulæ Kurilenses.*

3. L. RUBRO-VIRIDIS, *Baker*.—Gagea rubro-viridis, *Boiss. & Kotschy, Diagn.* ser. 2, iv. 106. Bulbus ovoideus 3–4 lin. crassus membranaceo-tunicatus basi bulbilliferus. Folia radicalia 1–2 anguste linearia graminoidea glabra convoluta 1–1½ lin. lata cauli subæquilonga. Caulis 4–5-pollicaris apice corymbosus 3-4-cephalus, foliis 1–2 parvis linearibus 6–18 lin. longis supra medium impositis. Pedicelli erecti 6–15 lin. longi, basi vel medio foliis minutis linearibus bracteati. Perianthium infundibuliforme erectum 5–6 lin. longum album intus distincte purpureo tinctum, segmentis oblanceolatis obtusiusculis 1½–2 lin. latis, in dimidio venis 3–5 longitudinalibus purpureis percursis, unguibus haud foveolatis. Stamina perianthio paulo breviora, antheris minutis flavis subglobosis. Stylus 3–4 lin. longus ovarium superans. Capsula anguste obovoidea 3 lin. longa apice truncata. *In regione alpina montium Palæstinæ* (*Hermon &c.*), Kotschy! Gaillardot! Hayne!

4. L. GRÆCA, *Endl. Gen.* 140; *Kunth, Enum,* iv. 245.—Anthericum græcum, *Linn. Sp.* 444; *Sibth. & Sm. Fl. Græc.* t. 336; *Lab. Dec.* v. 12, t. 8. fig. 2.—Phalangium græcum, *Poir. Encyc.* v. 250.—Lloydia cretica, *Boiss. in Bal. Pl. Orient. Exsic.* 1854, No. 152. Bulbi cæspitosi parvi globosi haud obliqui fibras copiosas emittentes, tunicis apice haud productis. Folia radicalia anguste linearia 2–4 caulem superantia vel breviora. Caulis 3–6-pollicaris 1–6-cephalus foliis 3–4 parvis anguste linearibus instructus. Perianthium primum cernuum, expansum, erectum, 5–9 lin. longum, infundibuliforme, albidum purpureo-venosum, segmentis oblanceolatis obtusis unguibus haud foveolatis. Stamina perianthio dimidium breviora, antheris minutis subrotundis. Ovarium cylindricum 3 lin. longum; stylus ½ lin. longus. Capsula anguste obovoidea membranacea 4 lin. longa obtuse angulata. *Montes Græciæ, Asiæ minoris, Cretæ, Cypri et insularum Ionicarum.*

Species exclusa.

LLOYDIA KUNAWARENSIS, *Royle, Ill.* t. 93. fig. 3.=Gagea persica, *Boiss.*=Bulbillaria gageoides, *Zucc.*

6. CALOCHORTUS, *Pursh*.

Flor. Bor. Am. i. 240; *Lindl. Bot. Reg.* sub t. 1661; *Schult. fil. Syst. Veg.* vii. 98 et 1530; *Endl. Gen.* 1095; *Kunth, Enum.* v. 231.—Cyclobothra, *Sweet, Brit. Flow. Gard.* t. 273; *Benth. Hort. Trans.* new series, i. 412; *Kunth, Enum.* iv. 227.—Fritillariæ sp. *H.B.K. Nov. Gen.* t. 677.

Perianthium 6-partitum, segmentis exterioribus sepaloideis viridibus lanceolatis, interioribus petaloideis obovato-cuneatis facie plus minus barbatis ad unguem supra basin foveola glandulosa rotundata instructis. *Stamina* 6, perianthio valde breviora æqualia obscure perigyna, antheris ligulatis vel oblongis basifixis obtusis vel acutis secus marginem totum dehiscentibus. *Ovarium* sessile triquetro-cylindricum triloculare, ovulis in loculo crebris biseriatis, stylo nullo, stigmatibus 3 brevibus recurvato-patentibus. *Capsula* membranacea septicide trivalvis, cylindrico-triquetra angulis obtusis, vel oblonga angulis profundis acutis. *Semina* parva discoidea semirotunda, testa albida nitida ad angulos in alas angustas producta. *Herbæ bulbosæ boreali-americanæ foliis anguste linearibus persistentibus, caulibus sæpe divaricato-ramosis, floribus speciosis, versicoloribus erectis vel pendulis infundibuliformibus vel globosis.*

Subgenus I. MACRODENUS. *Bulbus membranaceo-tunicatus. Petala profunde foveolata. Capsula oblonga.*

Perianthium expansum globosum nutans.

- Petala flava .... 1. *pulchellus.*
- Petala alba .... 2. *albus.*

Perianthium expansum erectum infundibuliforme.

- Petala obovato-cuneata extrorsum rotundata.
  - Petala flava .... 3. *Benthami.*
  - Petala pallide stramineo-lilacina.
    - Antheræ acutæ .... 4. *elegans.*
    - Antheræ valde acuminatæ .... 5. *apiculatus.*
- Petala ovato-oblonga acuminata .... 6. *Lyallii.*

Subgenus II. PLATYCARPUS. *Bulbus membranaceo-tunicatus. Petala leviter foveolata. Capsula oblonga.*

Petala aurea .... 7. *aureus.*

Petala straminea.. 8. *Nuttallii.*

Petala lilacina vel purpurea.

Caulis semper monocephalus .... 9. *uniflorus.*

Caulis oligocephalus.
Sepala facie distincte maculata .... 10. *flexuosus*.
Sepala immaculata.
Parviflora antheris parvis .... 11. *lilacinus*.
Grandiflora antheris magnis .... 12. *nitidus*.

Subgenus III. Cyclobothra. *Bulbus fibroso-tunicatus. Petala leviter foveolata. Capsula angusta.*

Segmenta perianthii exteriora interioribus subsimilia haud sepaloidea .... 13. *Hartwegii*.
Segmenta perianthii distincte dissimilia exteriora sepaloidea.
Petala purpurea .... 14. *purpureus*.
Petala flava .... 15. *flavus*.

Subgenus IV. Mariposa (Calochortus, *Kunth*). *Bulbus membranaceo-tunicatus. Petala leviter foveolata. Capsula angusta.*

Petala aurantiaca .... 16. *luteus*.
Petala saturate lilacina.
Petala distincte cuspidata... .... 17. *macrocarpus*.
Petala haud vel vix cuspidata .... 18. *splendens*.
Petala albida vel pallide lilacina vel straminea.
19. *venustus*. 20. *Gunnisoni*. 21. *Leichtlinii*.

Subgenus I. Macrodenus, *Baker*. *Bulbus* membranaceo-tunicatus. *Folia* in axillis haud bulbillifera. *Sepala* immaculata. *Petala* profunde foveolata. *Capsula* oblonga profunde acute angulata. *Pedicelli* fructiferi deflexi. *Calochortus*, Pursh, non Kunth.—*Cyclobothra*, Benth. et Lindl. ex parte, non Sweet.

1. C. pulchellus, *Dougl. MSS.*; *Wood, Proc. Acad. Phil.* 1868, 168. —Cyclobothra pulchella, *Benth. Hort. Trans. nov. ser.* i. 415, t. 14. fig. 1; *Lindl. Bot. Reg.* t. 1662; *Kunth, Enum.* iv. 228. Bulbus ovoideus membranaceo-tunicatus 6–9 lin. crassus. Caulis 1–1½-pedalis 6–12-cephalus profunde furcatus, ramis divaricatis. Folia infra furcam 1–2 linearia modice firma 6–12 poll. longa, prope basin 6–12 lin. lata. Bracteæ foliaceæ lineares acuminatæ 1–4-pollicares. Perianthium cernuum saturate flavum, sepalis oblongo-lanceolatis acutis 6–9 lin. longis facie immaculatis, petalis late oblongis 12–15 lin. longis subobtusis profunde foveolatis secus margines et faciem totam præsertim ad medium flavo-barbatis. Antheræ oblongæ obtusæ 2 lin. longæ, filamentis paulo breviores. Capsula oblonga 12–15 lin. longa profunde angulata. *California*, Douglas! Bridges, 282! Lobb, 240! Bigelow! &c.

2. C. ALBUS, *Dougl. MSS.*; *Wood, Proc. Amer. Acad.* 1868, 168; *Maund, Bot.* ii. t. 98.—Cyclobothra alba, *Benth. Hort. Trans. nov. ser.* i. 413, t. 14. fig. 3; *Lindl. Bot. Reg.* t. 1661; *Kunth, Enum.* iv. 228; *Flore des Serres*, t. 1174; *Belg. Hort.* vii. p. 201, t. 32. Bulbus ovoideus 6–9 lin. crassus membranaceo-tunicatus. Caulis 1–1½-pedalis 3–12-cephalus profunde furcatus ramis divaricatis. Folia infra furcam 1–2, inferiora plana linearia modice firma 6–12 poll. longa 6–9 lin. lata. Bracteæ foliaceæ lineares acuminatæ 2–6-pollicares. Perianthium globosum album cernuum, sepalis oblongo-lanceolatis acutis immaculatis 9–12 lin. longis, petalis obovato-oblongis obtusis 15–18 lin. longis profunde foveolatis secus margines et faciem totam præsertim ad medium tenuiter breviter albo-barbatis. Antheræ anguste oblongæ subacutæ, filamentis subtriplo breviores. Capsula late oblonga 12–15 lin. longa membranacea profunde acute angulata. *California*, Douglas! Coulter, 734! Bigelow! &c.

Var. β. PANICULATA.—Cyclobothra paniculata, *Lindl. Bot. Reg. sub* t. 1662; *Kunth, Enum.* iv. 288. Humilior, foliis angustioribus, floribus minoribus. *California*, Douglas, Bridges 282! Coulter 730! Hartweg 1984!

3. C. BENTHAMI, *Baker*.—Cyclobothra elegans, var. lutea, *Benth. Pl. Hartw.* 338.—Cyclobothra monophylla, *Lindl. Herb.*—Calochortus nitidus, *Wood, Proc. Acad. Phil.* 1868, 169 *non Dougl.* Bulbus ovoideus, membranaceo-tunicatus 6–8 lin. crassus. Caulis 3–6-pollicaris 3–6-cephalus. Folia 1–2, inferius majus corymbum superans lineare 6–9 poll. longum 3–5 lin. latum acuminatum. Bracteæ lineares foliaceæ 1–3-pollicares. Perianthium erectum expansum infundibuliforme, sepalis oblongo-lanceolatis acutis immaculatis flavo-viridibus 6–9 lin. longis, petalis saturate luteis sepalis æquilongis subobtusis profunde foveolatis secus faciem totam et margines flavo-barbatis. Antheræ lanceolatæ acutæ 1½ lin. longæ filamentis flavis paulo breviores. Pedicelli fructiferi insigniter cernui. Capsula oblonga obtusa 6–9 lin. longa profunde acute angulata. *California*, Hartweg, 1982! Bigelow! Fremont, 353! 1846! W. Lobb, 241! Var. *cornutus*, Wood, est forma floribus solitariis, sepalis longe acuminatis petala excedentibus.

4. C. ELEGANS, *Pursh, Flora*, i. 240; *Dougl. Hort. Trans.* vii. t. 9. fig. B; *Hook. fil. Bot. Mag.* t. 5976; *Wood, Proc. Acad. Phil.* 1868, 168.—Cyclobothra elegans, *Lindl. Bot. Reg.* sub t. 1661; *Kunth, Enum.* iv. 229.—C. cærulea, *Kellogg, Proc. Acad. Calif.* ii. 4. Bulbus anguste ovoideus membranaceo-tunicatus 5–6 lin. crassus. Caulis gracilis 3–6-pollicaris umbellatim 3–6-cephalus. Folium solitarium lineare 6–9 poll. longum 3–4 lin. latum. Bracteæ foliaceæ lineares vel lanceolatæ 1–3 pollicares. Perianthium expansum erectum late infundibuliforme, sepalis viridibus lanceolatis acutis 6–8 lin. longis, petalis obovato-cuneatis 9–12 lin. longis obtusis vel leviter cuspidatis

albidis vel pallide lilacinis basi profunde maculato-foveolatis secus margines et faciem præsertim circa foveolam pilis pallidis barbatis. Antheræ acutæ 2–3 lin. longæ filamentis 1½–2plo breviores. Pedicelli fructiferi insigniter deflexi. Capsula oblonga 9–12 lin. longa profunde acute angulata. *California*, Hartweg, 1986! Fremont, 360! 846! Jeffray, 976! *Missouri et Oregon*, Geyer, 299! Spalding! *Columbia britannica*, Douglas! Hinds! Var. SUBCLAVATUS, Baker (*California*, W. Lobb, 243) est forma parviflora petalis pilis paucis ad apicem foveolæ solum præditis. C. TOLMIEI, Hook. et Arn. Bot. Beech. 398 (*ad ripas fluv. Wallamet*, Tolmie!) est forma robusta grandiflora petalis secus faciem totam barbatis; var. LOBBII, Baker (*Oregon*, Lobb, 257), est forma similis antheris insigniter apiculatis; C. MAWEANUS, Hort. Leichtlin. (Bot. Mag. 5976. *California*, W. Lobb, 242!), est forma humilis pilosissima omnium, petalis prorsus faciem totam dense barbatis.

5. C. APICULATUS, *Baker*. Bulbus ovoideus membranceo-tunicatus. Caulis 1–1½-pedalis 1–9-cephalus. Folium solitarium planum lineare 6–12 poll. longum 3–9 lin. latum. Bracteæ lineares acuminatæ 1–3-pollicares. Perianthium expansum late infundibuliforme erectum. Sepala lanceolata albido-viridia acuta 8–9 lin. longa. Petala straminea late obovata obtusa 1 poll. longa distincte foveolata foveola dense barbata faciebus et marginibus pilis paucis præditis. Antheræ stramineæ 4 lin. longæ valde acuminatæ filamentis æquilongæ. Pedicelli fructiferi insigniter cernui. Capsula 12–15 lin. longa anguste oblonga. *Columbia britannica ad montes Pend Oreille et Kootenay*, Dr. Lyall! Fortasse varietas insignis *C. elegantis*.

6. C. LYALLII, *Baker*. Bulbus membranaceo-tunicatus. Caulis ½-pedalis 2–3-cephalus. Folium solitarium lineare planum 5–6-poll. longum 3–4 lin. latum. Bracteæ lineares acuminatæ 6–9 lin. longæ. Perianthium erectum expansum late infundibuliforme. Sepala albo-viridia lanceolata acuminata 6–9 lin. longa. Petala alba sepalis paulo longiora ovato-acuminata profunde maculato-foveolata, secus margines et faciem totam barbata. Antheræ flavæ subacutæ 2 lin. longæ filamentis paulo longiores. Capsula immatura oblonga, stylo brevi, stigmatibus recurvato-patentibus. *Columbia britannica ad apicem montis alt.* 5800 *pedes inter fluv. Columbia et Yakima*, Dr. Lyall!

Subgenus II. PLATYCARPUS, *Baker*. *Bulbus* membranaceo-tunicatus. *Folia* in axillis haud bulbillifera. *Sepala* interdum facie obscure maculata. *Petala* leviter foveolata. *Capsula* oblonga, profunde angulata. *Pedicelli* fructiferi erecti.

7. C. AUREUS, *S. Wats. Amer. Nat.* 1873, No. 5, p. 7. Caulis 4–6-pollicaris 1–2-cephalus, folio unico radicali lineari 3–4 poll. longo, bracteis

linearibus 2 poll. longis. Sepala oblongo- vel ovato-lanceolata flavo-viridia facie prope basin purpureo-maculata. Petala obovato-cuneata 15 lin. longa saturate flava, facie prope basin foveola dense barbata et supra basin macula purpurea instructa. Capsula immatura anguste oblonga. *Utah meridionalis in rupestribus arenosis,* Mrs. E. P. Thompson. (Non vidi.)

8. C. Nuttallii, *Torrey & Gray, Bot. Betchw.* 124; *Wood, Proc. Phil. Acad.* 1868, 169; *S. Wats. Bot.* 40 *Parall.* 347.—C. luteus, *Nutt. Journ. Acad. Phil.* vii. 51, *non Dougl.* Bulbus ovoideus membranaceo-tunicatus. Caulis 9–18-pollicaris, umbellatim 1–4-cephalus, foliis linearibus profunde canaliculatis, infimis 6–9 poll. longis, 3–4 lin. latis. Bracteæ lineares foliaceæ acuminatæ complicatæ 1–1½-pollicares. Perianthium late infundibuliforme erectum, sepalis lanceolatis 6–12 lin. longis acutis facie leviter coloratis obscure purpureo-maculatis, petalis 12–18 lin. longis late obovato-cuneatis obtusis stramineis supra basin foveola dense barbata et supra foveolam medio laminæ macula glabra præditis. Antheræ flavæ obtusæ 3–4 lin. longæ filamentis paulo breviores. Capsula oblonga 6–9-lin. longa profunde angulata. *Montes Scopulosi* (*Idaho, Montana, Utah, California borealis*), Nuttall! Burke! Bell, 33! Hall & Harbour, 529! &c.—*C.* eurycarpus, *S. Wats. Bot.* 40 *Parall.* 348, est verisimiliter forma magis alpina ejusdem speciei.—*C.* parviflorus, *Nuttall, MSS.,* est forma minor gracilior, petalis anguste obovatis subacutis 6 lin. longis longe a foveola supra medium laminæ maculatis.

9. C. uniflorus, *Hook. et Arn. Bot. Beech.* 398, t. 94; *Wood. Proc. Phil. Acad.* 1868, 168, *non Bot. Mag.* t. 5804. Bulbus 3–4 lin. crassus membranaceo-tunicatus. Caulis gracilis 3–6-pollicaris semper monocephalus. Folia 3–4 linearia, inferiora scapo æquilonga, 2–3 lin. lata. Perianthium erectum, pedunculo nudo 2–5-pollicari. Sepala lanceolata acuta viridia immaculata 6–7 lin. longa. Petala 9–12 lin. longa late obovato-cuneata pallide lilacina foveola obscura purpurea supra basin et pilis numerosis supra foveolam præditis. Antheræ obtusæ 1½ lin. longæ filamentis subtriplo breviores. Ovarium oblongum. Capsulam non vidi. *California,* Douglas! Coulter, 735! Bolander, 4666!

10. C. flexuosus, *S. Wats. Amer. Nat.* 1873, No. 5, p. 7. Caulis superne flexuosus ramosus. Bracteæ lineari-lanceolatæ 6–15 lin. longæ. Sepala oblongo-lanceolata viridula, facie macula saturate purpureo-aurantiaca prædita. Petala late obovato-cuneata 12–15 lin. longa purpurea, ungue saturate purpureo, foveola obscura aurantiaco-purpurea supra unguem instructa, pilis glandulosis ad marginem attingentibus. Capsula anguste oblonga. *Utah et Arizona,* Mrs. E. P. Thompson. (Non vidi.)

11. C. lilacinus, *Kellogg, Proc. Calif. Acad.* ii. 5.—C. umbellatus,

Wood, Proc. Phil. Acad. 1868, 168.—C. uniflorus, *Bot. Mag.* t. 5804, *non Hook. et Arn.* Bulbus ovoideus membranaceo-tunicatus. Caulis 4–6-pollicaris umbellatim 3–9-cephalus, pedicellis elongatis. Folium subradicale unicum lineare, supra corymbum multo eminens 4–6 poll. longum, 2–5 lin. latum. Bracteæ acuminatæ foliaceæ $1\frac{1}{2}$–3-pollicares. Perianthium erectum late infundibuliforme. Sepala lanceolata 6–7 lin. longa viridia, lilacino tincta, facie immaculata. Petala lilacina, obovato-cuneata, sepalis paulo longiora, foveola obscura supra unguem, et pilis paucis circa foveolam præditis, margine haud ciliata. Antheræ obtusæ $1\frac{1}{2}$ lin. longæ, filamentis triplo breviores, polline cæruleo. Capsula parva oblonga erecta. *California,* Bigelow! Bolander! Lobb, 246! (forma floribus majoribus, petalis ad pollicem longitudine et latitudine attingentibus, pedicellis 4–5 poll. longis).

12. C. NITIDUS, *Dougl. Hort. Trans.* vii. 277, t. 9. fig. A; *Schult. fil. Syst. Veg.* vii. 1530; *Hook. Flor. Bor. Am.* ii. 183, *non Wood.*—Cyclobothra nitida, *Kunth, Enum.* iv. 230. Bulbum non vidi. Caulis erectus strictus $1\frac{1}{2}$–2-pedalis umbellatim 3–4-cephalus. Folia 2–3 ascendentia anguste linearia convoluta acuminata, inferiora 6–9-pollicaria basi 3 lin. lata. Bracteæ foliaceæ lineares acuminatæ. Perianthium erectum expansum late infundibuliforme, sepalis linearibus acuminatis 15–18 lin. longis, petalis obovato-spathulatis obtusis pallide lilacinis distincte foveolatis foveola dense barbata, secus faciem et margines pilis longis sparsis præditis. Antheræ flavæ obtusæ 4 lin. longæ filamentis paulo breviores. Pedicelli fructiferi erecti. Capsula oblonga 1 poll. longa profunde acute angulata. *Columbia britannica,* Douglas! *Oregon,* Spalding!

Subgenus III. CYCLOBOTHRA (*Sweet*). *Bulbus* fibroso-tunicatus. *Folia* in axillis bulbillifera. *Sepala* facie maculata et interdum pilosa. *Petala* facie leviter foveolata. *Capsula* cylindrico-triquetra. *Omnes mexicani.*

13. C. HARTWEGII, *Benth. Pl. Hartw.* 26.—Cyclobothra Hartwegii, *Kunth, Enum.* iv. 231. Bulbum non vidi. Caulis sesquipedalis flexuosus, foliis 5–6 ascendentibus anguste linearibus glabris firmis canaliculatis $1\frac{1}{2}$–2 lin. latis axillis interdum bulbilliferis, infimis pedalibus, supremis geminatis vel ternis 3–4 poll. longis. Flores 1–2. Perianthium 2 poll. longum flavidum purpureo suffusum, segmentis oblongo-lanceolatis, exterioribus acutioribus paulo brevioribus medio 4–4 lin. latis supra maculam suprabasalem pilis paucis instructis, interioribus 6 lin. latis dorso saturate purpurascentibus foveola obscura centrali et pilis sparsis late dispersis præditis. Filamenta 6–7 lin. longa. Antheræ obtusæ 3–4 lin. longæ. Ovarium 1 poll. longum cylindrico-triquetrum, stigmatibus parvis recurvato-patentibus. Capsula linearis triquetra 3 lin. crassa. *Mexico in pascuis*

montosis ad Aguas Calientes, Hartweg, 230! Ab speciebus omnibus generis reliquis recedit et ad *Fritillariam* accedit segmentis perianthii exterioribus subpetaloideis.

14. C. PURPUREUS, *Baker.*—Fritillaria purpurea, *H. B. K. Nov. Gen.* i. 288.—Cyclobothra purpurea, *Sweet, Flow. Gard.* ser. ii. t. 20.—Calochortus Bonplandianus, *Schult. fil. Syst. Veg.* vii. 1532.—Cyclobothra propinqua, *Schauer, Linn.* xix. 701. Bulbus ovoideus fibroso-tunicatus. Caulis 1–1½-pedalis, 1–2-cephalus, interdum profunde furcatus, foliis 5–6 firmis ascendentibus bulbillis magnis in axillis præditis, inferioribus linearibus 5–6 poll. longis, superioribus lanceolatis 1–2 poll. longis basi 3–4 lin. latis. Flores primum cernui, ad anthesin horizontales. Perianthium purpureum 9–12 lin. longum, segmentis exterioribus brevioribus oblongo-lanceolatis dorso viridibus facie glabris infra medium distincte maculatis, interioribus petaloideis oblongo-oblanceolatis subobtusis 3 lin. latis ad unguem obscure foveolatis per totam mediam pilis hispidis purpureo-flavis barbatis. Filamenta 3 lin. longa, antheris obtusis duplo brevioribus. Ovarium cylindrico-triquetrum 4–5 lin. longum, stigmatibus recurvato-patentibus. *Mexico,* Graham! Galeotti, 5512! &c.—CYCLOBOTHRA GRANDIFLORA, *Mart. & Gal. Enum.* p. 13; *Kunth, Enum.* iv. 698, est forma grandiflora sepalis præsertim majoribus ad pollicem longitudine attingentibus. *Mexico,* Galeotti, 5513!—CALOCHORTUS FUSCUS, *Schult. fil. Syst. Veg.* vii. 1534, est verisimiliter forma hujus speciei sepalis facie leviter setosis.

15. C. FLAVUS, *Schult. fil. Syst. Veg.* vii. 1533; *Maund, Bot.* iv. t. 170—Cyclobothra flava, *Lindl. Bot. Reg.* sub t. 1662.—Fritillaria barbata, *H. B. K. Nov. Gen.* i. p. 288, t. 677.—Cyclobothra barbata, *Sweet, Flow. Gard.* t. 273.—C. lutea, *Lindl. Bot. Reg.* t. 1663.—Calochortus pallidus, *Schult. fil. Syst. Veg.* vii. 1533. Bulbus ovoideus fibris firmis reticulatis tunicatus. Caulis 1–6-cephalus 1–2-pedalis gracilis fragilis sæpe profunde furcatus ramis erecto-patentibus. Folia infra furcam 2–3 linearia longe acuminata 9–12 poll. longa; bracteæ bulbillis parvis in axillis præditæ, inferiores lineares acuminatæ, superiores parvæ lanceolatæ subscariosæ. Perianthium primum nutans, flavum 8–10 lin. longum segmentis exterioribus paulo brevioribus ovatis acutis dorso viridibus facie flava macula obscura et setis paucis medio præditis, interioribus obovatis subobtusis vel cuspidatis petaloideis 4–6 lin. latis supra unguem foveola obscura et supra foveolam per totum medium setis purpurascentibus brevibus præditis. Filamenta 4 lin. longa, antheris luteis obtusis duplo brevioribus. Stylus triquetro-cylindricus 4½–5 lin. longus. *Mexico,* Pavon! Hartweg, 404! Coulter, 1556–57! Bourgeau, 657!

Subgenus IV. MARIPOSA (*Wood*). *Bulbus* membranaceo-tunicatus. *Folia* convoluta in axillis haud bulbillifera. *Sepala*

facie interdum maculata. *Petala* basi leviter foveolata. *Pedicelli* fructiferi erecti. *Capsula* lineari-triquetra obtuse angulata. *Stirps* floribus omnium speciosissimis, speciebus omnibus arcte affinibus.

16. C. LUTEUS, *Dougl. MSS.*; *Lindl. Bot. Reg.* t. 1567; *Kunth, Enum.* iv. 233; *Paxt. Mag.* i. t. 221; *Flore des Serres,* ii. t. 40; *Wood, Proc. Acad. Phil.* 1868, 169. Bulbus ovoideus membranaceo-tunicatus 6–9 lin. crassus. Caulis 1–1½-pedalis firmus flexuosus 1–4-cephalus. Folia 3–4 anguste linearia glauca canaliculata 6–12-pollicaria. Bracteæ foliaceæ lineares acuminatæ 1–2-pollicares. Sepala lanceolata acuta vel acuminata flavo-viridia 9–15 lin. longa, facie flavo-maculata nigro-punctata. Petala saturate aurantiaca obovato-cuneata truncata 12–18 lin. longa et lata, supra unguem foveola obscura dense barbata instructa, facie supra foveolam subcalvata sæpissime punctis brunneis zonata et ad medium maculata. Antheræ obtusæ 3–4½ lin. longæ filamentis aurantiacis paulo breviores. Capsula lanceolato-triquetra 12–21 lin. longa, 3–4 lin. lata, obtuse angulata. *California,* Douglas! Hartweg, 1983! Bigelow! Lobb, 244! &c.

Var. WEEDII.—C. Weedii, *Wood, Proc. Acad. Phil.* 1868, 169. Petala saturate aurantiaca, medio haud maculata, prorsus faciem totam barbata. *California,* Weed, Coulter, 731 ex parte!

17. C. MACROCARPUS, *Dougl. Hort. Trans.* vii. 276, t. 8; *Lindl. Bot. Reg.* t. 1152; *Schult. fil. Syst.* vii. 1530; *Kunth, Enum.* iv. 232; *Wood, Proc. Acad. Phil.* 1868, 169. Bulbus ovoideus membranaceo-tunicatus 9–15 lin. crassus. Caulis firmus flexuosus 1½–2-pedalis 2–6-cephalus. Folia 3–4 anguste linearia convoluta, inferiora 6–9-pollicaria. Bracteæ firmæ convolutæ 1–4-pollicares. Sepala lanceolata viridia immaculata 15–24 lin. longa margine late scarioso. Petala sepalis subæquilonga saturate lilacina obovata distincte cuspidata, medio immaculata, ungue pilis paucis circa foveolam obscuram barbatam prædito. Antheræ subobtusæ 5–6 lin. longæ filamentis lilacinis æquilongæ. Capsula lineari-triquetra, 2–3 poll. longa, 3–4 lin. crassa, obtuse angulata. *Columbia britannica,* Douglas! Lyall! Geyer, 618! Adest forma petalis rubellis.

18. C. SPLENDENS, *Doug. MSS.*; *Benth. Hort. Trans.* n. s. i. 411, t. 15. fig. 1; *Lindl. Bot. Reg.* t. 1676; *Kunth, Enum.* iv. 232; *Wood, Proc. Phil. Acad.* 1868, 169. Bulbus ovoideus membranaceo-tunicatus. Caulis flexuosus 1½–2-pedalis 3–5-cephalus. Folia 3–4 anguste linearia convoluta 6–9-pollicaria. Bracteæ lineares acuminatæ 2–3-pollicares. Sepala lanceolata viridia immaculata 12–18 lin. longa. Petala saturate lilacina obovato-cuneata 18–24 lin. longa et lata extrorsum rotundata vel leviter cuspidata, medio concoloria vel interdum rubello maculata, tertio inferiore pilis purpureis circa foveolam barbatam prædito. Antheræ subacutæ 5–6 lin. longæ,

filamentis subæquilongæ. Capsula lineari-triquetra 1½–2-pollicaris 3–4 lin. crassa. *California,* Douglas! Lobb! Coulter, 731–32!

19. C. VENUSTUS, *Benth. Hort. Trans.* n. s. i. 412, t. 15. fig. 3; *Lindl. Bot. Reg.* t. 1669; *Kunth, Enum.* iv. 233; *Maund, Bot.* i. t. 30; *Paxt. Mag.* i. t. 175; *Flore des Serres,* ii. t. 40; *Wood, Proc. Acad. Phil.* 1868, 169. Bulbus ovoideus membranaceo-tunicatus 6–9 lin. crassus. Caulis flexuosus 1–2-pedalis 2–6-cephalus. Folia 3–4 anguste linearia convoluta. Bracteæ lineares foliaceæ 2–4-pollicares. Sepala lanceolata 12–18 lin. longa, facie interdum distincte maculata. Petala late obovato-cuneata extrorsum rotundata albida vel pallide lilacina, medio concoloria vel aurantiaco-purpureo maculata, ungue foveola obscura barbata prædito et supra foveolam punctis rubro-brunneis et pilis paucis instructo. Antheræ obtusæ 3 lin. longæ filamentis paulo breviores. Capsula lineari-triquetra 15–18 lin. longa, 3–4 lin. crassa, leviter angulata. *California,* Douglas! Jeffray, 1276! Bigelow! Coulter, 733! Hartweg, 1983! &c.

Var. CITRINUS, *Baker.* Petala citrina, macula centrali rubro-brunnea ad apicem aurantiaca. *California,* Bridges, 284! &c. Ab typo ad *C. luteum* recedit.

20. C. GUNNISONI, *S. Wats. Bot.* 40 *Parall.* 348; *Regel, Enum. Descrip. Plant. Nov.* 1873, 21. Bulbus ovoideus membranaceo-tunicatus. Caulis firmus 1–1½-pedalis 1–4-cephalus. Folia 3–4 anguste linearia canaliculata, inferiora 6–9 poll. longa. Bracteæ lineares foliaceæ. Sepala lanceolata acuminata 12–15 lin. longa viridia facie vix maculata. Petala obovato-cuneata, 15–18 lin. longa et lata, extrorsum rotundata vel leviter cuspidata, pallide lilacina vel albida medio immaculata, tertio inferiore lilacino saturatiore zonata, dense pilosa et foveola barbata prædita. Antheræ acutæ 3–4 lin. longæ, filamentis subæquilongæ. Ovarium cylindrico-triquetrum. *Montes Scopulosi Americæ borealis* (*Colorado, Utah*), Geyer, 68! 609! Burke! Gunnison.

21. C. LEICHTLINII, *Hook. fil. Bot. Mag.* t. 5862. Bulbus parvus ovoideus membranaceo-tunicatus. Caulis 5–6-pollicaris gracilis flexuosus 1–3-cephalus. Folia 3–4 anguste linearia convoluta 1½ lin. lata. Bracteæ foliaceæ 1–2-pollicares. Sepala lanceolata viridia 12–15 lin. longa. Petala obovato-cuneata 18–21 lin. longa et lata extrorsum leviter cuspidata alba, ungue macula purpurea supra et pilis paucis circa foveolam obscuram prædito. Antheræ flavæ obtusæ 3 lin. longæ filamentis paulo breviores. Ovarium cylindrico-triquetrum. *California ad montes Sierra Nevada,* Roezl in Hort. Leichtlin.! (*v. v. in Hort. Kew.*).

Contributions to the Botany of the Expedition of H.M.S. 'Challenger'. Communicated by J. D. Hooker, C.B., M.D., F.R.S.

[Read November 20, 1873.]

It is proposed to communicate from time to time to the Linnean Society notices of the collections made by Mr. H. N. Moseley, who is charged with the duty of botanically investigating the various places visited by H.M.S. 'Challenger.' These notices will comprise the results of the examination of the collections at the Kew Herbarium, such portions of Mr. Moseley's letters as especially illustrate these collections, and the reports of the botanists to whom the examination of different groups has been intrusted.

I. On the Marine Algæ of St. Thomas and the Bermudas, and on *Halophila Baillonis*, Asch.

Extracts from Mr. Moseley's Letter, dated June 27, 1873.

At St. Thomas, at the desire of Prof. Thomson, flowering plants were not collected. An extensive list of plants occurring in the island is given in 'A Historical Account of St. Thomas, W. I.,' by J. P. Knox *. A considerable number of fungi were collected, and a few freshwater algæ. Some marine algæ, brought up by the dredge in from five to fifteen fathoms, were preserved. Together with these algæ came up also a few specimens of a flowering plant, apparently *Halophila*, which genus, according to Dr. P. Ascherson, has hitherto been known to occur only in the Red Sea and the Indian and Pacific Oceans. Another sea-grass (*Thalassia testudinum*) was obtained in abundance in water from 2 to 6 feet deep; but only male flowers were met with.

* * * * * *

(Bermuda.)

In the sea, at moderate depths, from half a fathom to two fathoms, grows a sea-grass † in great abundance; of this only male flowers were found. Several of the marine algæ collected were identical with those found at St. Thomas. A *Sargassum*

* New York, Chas. P. Scribner, 1852.

† There is some doubt about the specimens; but the Bermudan plant appears to be *Cymodocea manatorum*, Asch.

(*S. bacciferum*) grows in abundance attached to rocks at Harrington Sound, and covered with fructification. Some algæ were obtained with the dredge from thirty-one fathoms. The great dampness of the air at Bermuda favours the growth of a fleshy lowly organized alga (*Nostoc*), which covers the roofs of the caves, grows in profusion amongst the roots of grass on lawns, &c., and covers the rocks near the shore, in some places so thickly that a bushel of it could be gathered in a short time.

The algæ sent by Mr. H. N. Moseley were submitted to Prof. Dickie, who has supplied the following determinations (Aug. 28, 1873) :—

St. Thomas, 5–15 fathoms.

RHODOMELACEÆ.

POLYSIPHONIA SUBTILISSIMA, *Mont.*
Upon *Penicillus dumetosus* and *Caulerpa Ashmeadii.*

SIPHONACEÆ.

CAULERPA ASHMEADII, *Haw.*

C. CUPRESSOIDES, *Ag.*

C. MEXICANA, *Sonder.*

HALIMEDA OPUNTIA, *Lamx.*

H. TRIDENS, *Lamx.*

H. INCRASSATA, *Lamx.*

UDOTEA CYATHIFORMIS, *Dne.*

U. CONGLUTINATA, *Lamx.*

U. FLABELLATA, *Lamx.*

U. HALIMEDA, *Ktz.*

RHIPILIA LONGICAULIS, *Ktz.*

VALONIACEÆ.

PENICILLUS DUMETOSUS, *Dne.*

ANADYOMENE FLABELLATA, *Lamx.*

DICTYOSPHÆRIA FAVULOSA, *Dne.*

There is nothing deserving special remark in reference to size

or colour of the algæ recorded here as dredged at St. Thomas in five to fifteen fathoms.

Most of them are also found on the Floridan coast of the United States; and several seem to be chiefly confined to the Gulf of Mexico and neighbouring shores, such as *Caulerpa mexicana, C. Ashmeadii, Halimeda tridens, H. incrassata, Penicillus*, *Rhipilia*, and species of *Udotea.*

Bermuda.

DICTYOTACEÆ.

HALISERIS JUSTII, *Lamx.*

All dredged in 31 fathoms, very dwarf, and denticulate with one exception, in other general characters and colour similar to specimens from shallow water.

PADINA PAVONIA, *Lamx.*

Shallows only.

ZONARIA VARIEGATA, *Lamx.*

Shallows, and many from 31 fathoms, the former olive, the latter mostly blue-green in colour and rather thinner in texture than usual.

Z. LOBATA, *Ag.*

Shallows only.

DICTYOTA BARTYRESIANA, *Lamx.*

Shallows only, small and rather imperfect, but, I think, may be referred to this species.

D. LIGULATA, *Ktz.*

From 31 fathoms.

D. DICHOTOMA, *Huds.*

Some from 31 fathoms seem to be dwarf forms of this species.

ASPEROCOCCUS SINUOSUS, *Bory.*

In shallow water.

CHORDARIACEÆ.

MESOGLOIA VIRESCENS, *Carm.*

Shallows only.

RHODOMELACEÆ.

POLYSIPHONIA EXILIS, *Harv.*

P. SUBTILISSIMA, *Mont.*

DASYA TUMANOWICZI, *Gatty.*

These three from shallow lagoons.

LAURENCIACEÆ.

LAURENCIA OBTUSA, *Lamx.*

Also var. *crucifera,* Ktz.

L. GEMMIFERA, *Harv.*

These in shallow water, the first abundant.

CORALLINACEÆ.

MELOBESIA PUSTULATA, *Lamx.*

From 31 fathoms, on various Algæ.

SPHÆROCOCCOIDEÆ.

GRACILARIA CERVICORNIS, *J. Ag.*

One dwarf specimen from 31 fathoms.

G. CONFERVOIDES, *Grev.*

G. FEROX, *J. Ag.*

Both from shallows, the former very dwarf.

G. POITEI, *Lamx.*

From shallows.

GELIDIACEÆ.

HYPNEA CORNUTA, *J. Ag.*

I have not seen authentic specimens of this; but the examples, from shallows, seem to agree with var. α of this species. From 31 fathoms.

EUCHEUMA ISIFORME, *J. Ag.*

Specimens both from shallows and 31 fathoms are identical in colour, those from deeper water, however, being more slender and with fewer branches.

SQUAMARIEÆ.

PEYSSONELIA DUBYI, *Crouan.*

From 31 fathoms; colour as usual.

HELMINTHOCLADIEÆ.

LIAGORA VALIDA, *Harv.*

In shallows.

GALAXAURA LAPIDESCENS, *Lamx.*

G. RUGOSA, *Lamx.*

Both from 31 fathoms; the latter also in shallows.

SCINAIA FURCELLATA, *Bivona.*

A solitary and imperfect specimen of small size, from 31 fathoms.

CRYPTONEMIACEÆ.

KALLYMENIA RENIFORMIS, *J. Ag.?*

A few specimens, very fragmentary, from 31 fathoms, with some doubt are referred to this species.

CHRYSYMENIA HALYMENIOIDES, *Harv.*

A single very small example, 1 inch in height, from 31 fathoms, has the structure of the genus, and, I think, may be referred to the above species.

C. AGARDHII, *Harv.*

A very dwarf and matted variety from shallow water.

C. DICHOTOMA, *J. Ag.?*

A single specimen, rather fragmentary, has the structure &c. of this plant; but I have not seen authentic examples. From 31 fathoms.

CERAMIACEÆ.

CENTROCERAS CLAVULATUM, *Ag.*

C. CRYPTACANTHUM, *Ktz.*

Both from shallow water.

SIPHONACEÆ.

CAULERPA CLAVIFERA, *Ag.*

In lagoons.

C. MEXICANA, *Sonder.*

From shallows, and also dredged at 31 fathoms, specimens from this depth well developed and of the usual colour.

UDOTEA CONGLUTINATA, *Lamx.*

From 31 fathoms.

RHIPILIA LONGICAULIS, *Ktz.*

In shallows.

CODIUM TOMENTOSUM, *Stackh.*

From 31 fathoms, large and of the ordinary colour.

VAUCHERIA ——?

From 31 fathoms, too imperfect for recognition of the species.

VALONIACEÆ.

PENICILLUS DUMETOSUS, *Dne.*

In shallow lagoons.

STRUVEA RAMOSA, n. sp.

Stipes sursum opposite ramosus, flabellis subellipticis; filis anastomosantibus tripinnatis, articulis inferioribus pinnarum 7–8plo, superioribus 3–4plo diametro longioribus.

The only two species hitherto described (and both figured in 'Phycologia Australis,' vol. i.), have each but one flabellum; the present has a repetition of such; I believe it must be referred to the genus, the stipes being unicellular and monosiphonous, with transverse-rugal and thin reddish calcareous coat at the lower part. From 31 fathoms.

ULVACEÆ.

ENTEROMORPHA COMPRESSA, *Grev.*

In shallows.

CONFERVACEÆ.

CLADOPHORA LUTEOLA, *Harv.*

The specimens imperfect and entangled, but, I think, may be referred to the species mentioned.

In lagoons.

C. PROLIFERA, *Ktz.*

In much the same condition as the last.

In shallows.

CHÆTOMORPHA AEREA, *Dillw.*

In shallow water.

The total number of species from Bermuda amounts to forty-one, viz. nine olive, twenty-one red, and eleven green—about one half of these being from 31 fathoms, viz. four olive, eleven red, and five green. Of the entire number, twenty-two species occur on the shores of the United States, and twelve on European coasts, viz. three olive, six red, and three green.

Dr. Rein has recently published * a paper "Ueber die Vegeta-

* Vortrag, gehalten beim Jahresfeste der S. N. G., 25. Mai, 1873.

tions-Verhältnisse der Bermudas-Inseln," containing an enumeration of the marine algæ. These include 109 species, of which 23 are Melanospermeæ, 50 Rhodospermeæ, and 36 Chlorospermeæ.

The marine Phanerogams were sent to Dr. Ascherson; the following is an extract from his note upon them.

Berlin, June 25, 1873.

As to the *Halophila*, there can be no doubt that the flowers, unknown to me hitherto, will prove it to be a congener of *H. ovalis*, from which, however, it differs specifically in its serrulate leaves.

This plant was found half a century ago by Bertero. We have in our collection a very imperfect specimen sent by Prof. Balbis, under the name of *Serpicola quadrifolia*. * * I do not know any publication where the name is quoted, and have called the plant *Halophila Baillonis*, because I got the first complete, though barren, specimens from Prof. Baillon (" Martinique, leg. Hahn ").

II. Notes on the Vegetation of Bermuda. By H. N. Moseley, Naturalist to H.M.S. 'Challenger'.

[Read Dec. 18, 1873.]

The terrestrial vegetation of the islands divides itself over five principal stations, each of which has a flora more or less peculiar to itself. These are:—the coast-line with its littoral flora; the peat-bogs or marshes; the shallow brackish ponds; the caves; and the remaining general land surface.

The coast is either rocky, presenting an irregular surface of weathered calcareous sandstone, or sandy, the sand being blown up into heaps or dunes covering extensive tracts. Abundantly along the whole coast-line occur two low shrubs. One, a Composite (*Borrichia*) with a yellow flower, occurs in two forms: in one the thick succulent leaves are bright green and shining; in the other they are glaucous and downy. The two varieties grow side by side, and contrast strikingly with each other. Occasionally examples of the two different leaf-forms are to be found on

separate branches of the same bush. With the Composite occurs another bush (*Tournefortia gnaphalodes*, R. Br.) with downy leaves and white flower. With these are associated three trailing succulent plants, only one of which, *Sesuvium*, was obtained in flower; another, of which the fruit was procured (*Ipomœa pes-capræ*, Sw.) has a convolvulus-like flower; and the third, not met with at all, is said to have a papilionaceous flower.

A small Euphorbiaceous plant (*Euphorbia buxifolia*, Lam.) with a peculiar symmetrical arrangement of the leaves on the stalk, grows in abundance in crevices of the rock; and a succulent plant (*Salicornia ambigua*, Mich.), which does not flower till July, grows on the very verge of the waves. A Tamarisk (*T. gallia*, L.) and a shrub with hard round woody fruit (*Conocarpus erectus*, Jacq.) are common. On the sand dunes the plant which acts as the principal binding weed is a hard prickly grass (*Cenchrus*), with pinkish inflorescence and long deeply penetrating root-fibres. A destruction of the binding weeds leads at once to an encroachment of the sand. A crucifer (*Cakile æqualis*, L'Hér.) is abundant, and also a shrub (*Scævola*) with succulent glassy leaves and irregular flowers. Beside the Mangrove-swamps are other swamps resembling them closely in appearance, but occupied by a quite different tree, with a small white flower and greyish leaves (*Avicennia*).

The peat-bogs or marshes lie in the inland hollows between two ranges of hills, which consist of ancient sand dunes more or less consolidated into rock. The chief feature of the vegetation of these marshes is formed by the ferns, especially two Osmundas (*O. cinnamomea*, L., and *O. regalis*, L.), which appear to occur in all the marshes in the island, together with *Pteris aquilina*, L., and several other species of ferns, all of which occur only in the marshes. Some ferns are confined to particular marshes. In some *Acrostichum aureum*, L., grows densely and to a height of 4 to 5 feet. A *Sphagnum* grows at the base of the ferns, but not very luxuriantly. The Junipers thrive in the marshes, and also in many the Palmetto, of which there are two forms, tall and dwarf. A diœcious shrub, *Myrica cerifera*, L., grows in abundance in the marshes, also *Rhus toxicodendron*. In the water-holes and ditches occur a polygonaceous plant (*P. acre*, H. B. K.?) and a plant with leaves like a Ranunculus but very small flowers almost concealed in the mud (*Hydrocotyle repandum*, Pers.), a trailing plant (*Dichondra repens*, Forst.) with small yellow flowers,

an Orchid (*Spiranthes brevifolia*, Chap.*), a *Lemna*, and about twelve species of *Cyperaceæ*. Nearly all the lichens and fungi obtained in Bermuda were found in the marshes. One lichen, a *Cœnomyce*, is very abundant on the rhizomes of ferns. The peat-water is full of a *Conferva*. The peat is mainly composed of the débris of the rhizomes of the ferns and roots of the sedges, especially one very large species (*Cladium*); *Sphagnum* is not abundant enough to take any great share in its formation. The peat burns well, and has much the same appearance as ordinary house-peat. The stems of junipers are occasionally found in it in good preservation and larger size than any now growing in the island. A bed of lignite was found, in excavating for the Bermuda dock, at a depth of 50 feet, which is evidently the remains of an ancient peat-bog probably overwhelmed by encroachment of sand and then sunk, either by general subsidence of the island or, perhaps, falling-in of some underlying cave.

In some of the valleys and hollows inland occur sheets of shallow water, sometimes as much as a quarter of a mile long. Several of these are to be met with on the road from Hamilton to Somerset Island. These sheets of water, or ponds, sometimes adjoin a peat-marsh; but their water is not at all peaty. In the water of several no salt was perceptible to the taste; but they are said to be salter at certain seasons. In these places grows a Naiadaceous plant (*Ruppia*), which was found in flower; the male flowers project just above the surface of the water. The water is full of *Confervæ* and various microscopic *Algæ*. Around the shores grows a *Typha* (*T. angustifolia*, L.), occasionally mangroves, and marsh-ferns, and several sedges. At the entrances to the caves of Bermuda are found extensive hollows, formed apparently by the falling in of former extensions of the present caves. These hollows are shady and moist, and covered with a luxuriant growth, several species of which are restricted to certain caves at Paynter's Vale. Coffee grows wild in these caves, forming trees of considerable size. A Jessamine is abundant about the caves.

The main feature of the general vegetation of the island is, of course, made up of the Juniper. Nearly the whole country which is not cultivated is covered with a dense growth of a *Lantana*

* This is probably the same as *Spiranthes tortilis*, Rich., of Dr. Rein's list. Mr. Moseley's specimens were identified with Chapman's plant, which is only known from descriptions and is confined to Florida.

(*L. camera*, Sch.), said to have been introduced from Madeira; but an Acacia-like plant (*Leucæna glauca*, Bth.), with a long tap-root, is considered by General Lefroy a more pernicious weed. The Oleander grows very luxuriantly and is used for hedges. Common Fennel has spread itself and grows all over the islands. Several shrubs and trees are confined to the neighbourhood of Paynter's Vale, which is the wildest and least-cultivated region, and at the same time sheltered and moist. It is here that the wild oranges and lemons grow most abundantly. Several of the islands lying isolated in Castle Harbour were visited; but no plants were found on them which had not been observed elsewhere. In some of the smaller ones vegetation was very scanty, evidently from want of shelter.

On the whole about 160 species of flowering plants were collected in Bermuda. A large number are certainly introduced weeds; and probably not more than 100 are true Bermudan plants.

The plants of Bermuda which are of West-Indian origin were transported thither probably, as Grisebach states, by the Gulf-stream or general drift of heated surface-water in this direction. Others may have travelled with the cyclones which pass constantly from the West Indies in the direction of Bermuda and sometimes reach the island. There are no winds blowing directly from the American coast which would be likely to carry seeds—the anticyclones taking a different direction. It is, however, probable that the occurrence of American plants in the island is connected with the fact that the islands are visited from time to time by immense numbers of migratory birds from that continent, especially during their great southern migration.

The American Golden Plover, *Charadrius marmoratus*, seems to visit Bermuda in the greatest numbers; but various other birds frequenting marshes (gallinules, rails, and snipes) come in no small quantities every year. These birds have probably brought a good many plants to Bermuda, as seeds attached to their feet or feathers or in the digestive track; and as the birds which visit the islands in the greatest numbers are mostly water-birds, it would be of some interest were the Bermuda marsh-plants especially North American.

The seed used for the onion crops in Bermuda is all imported yearly, mostly from Madeira; and the potato seed is brought from the United States.

Various seeds cannot fail to reach the island with these imports; and the constant importation of hay must have led to the introduction of many more. Shipwrecks furnish additions to the flora occasionally. A vessel laden with grapes was wrecked on the coast a short time ago. The boxes of grapes were washed ashore; and the grape-seeds germinated in abundance, so that General Lefroy was able to gather a number of small plants for his garden.

[The determinations of the plants alluded to in Mr. Moseley's notes have been made at the Kew Herbarium. The whole collection included about 162 species, of which 71 belong to the Old World. Dr. Rein's *list* includes 128 species; and of these at least 53 are amongst those collected by Mr. Moseley.]

III. Notes on Fresh-water Algæ obtained at the Boiling Springs at Furnas, St. Michael's, Azores, and their Neighbourhood. By H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.'

[Read April 16, 1874.]

In the Report of the Circumnavigation Committee, in the section relating to botany, attention is drawn to the fact that Algæ are found in hot springs, and observations on such Algæ are requested. Whilst staying at St. Michael's, Azores, I visited Furnas with a large party from H.M.S. 'Challenger.' Here there are two sets of boiling springs, in each of which I found abundance of Algæ, some of them growing under remarkable conditions.

In the valley of Furnas there are two distinct sets of hot springs—those at the village of Furnas itself, and others at a distance of two or three miles, situate on the shores of the lake of Furnas. In both places numerous hot and cold mineral springs discharge themselves through openings of various sizes irregularly distributed over an area covered with partly ancient, partly modern, geyser-formation or hot-spring deposit.

At the springs near the lake of Furnas the principal spring consists of a large basin filled with bluish water, in the centre of which a violent ebullition is always going on. The water in this basin is intensely hot. No Algæ were found in it. The stones at the margin are covered with a red incrustation; but this appears to be entirely mineral. A short distance from this basin

and a little further from the lake is a second spring, where from a cleft about a foot wide are discharged steam and hot water together with large quantities of sulphuretted hydrogen. The hot water is thrown out in rapidly succeeding jerks and splashes, and strikes against the sides of the cleft from which the discharge proceeds. The sides of the cleft, where bathed by these constant splashes of hot water, are covered with a layer of shiny-looking pale yellowish-green matter, with an irregular wavy surface. Some of this layer was cut off with a knife, with considerable difficulty, since the water was so hot as to scald the hands when it splashed them. The layer was about an inch and a half thick. It was tough and elastic, and appeared composed of gelatinous green vegetable matter mingled with a grey earthy deposit disposed in successive layers. The dried specimen accompanying these notes has, of course, shrunk greatly; and hence the earthy constituents of the mass are more conspicuous than in the fresh condition. The specimens preserved in fluid preserve their original character well. On looking at the mass in section it is seen that immediately internally to the outer yellowish-green crust is a narrow layer coloured of an intense blue-green (phycocyan); and on observing vertical sections of the mass with the microscope, the Algæ composing it are found intensely coloured in this layer and very pale on the outer or exposed layer. It would appear probable that the *Oscillatoriæ* are unable to develop their full colouring-matter on the outer crust, where it is exposed directly to a solution containing sulphurous acid and various gases, but that they are able to do so a short distance within the mass, where protected, and that here the growth is most vigorous. Deeper still in the mass the conditions are again less favourable, and the Algæ become pale from want of sufficient light &c. The mass itself is composed almost entirely of *Oscillatoriæ* mingled with a *Chroococcus*.* The *Chroococcus* was not so abundant in the samples of incrusting matter in this hot spring as in those from the spring at Furnas. Amongst the green matter are a few skeletons of *Diatomaceæ*, (a *Navicula*); but these are very probably derived from a cool spring situate just above the sulphur-spring, the water of which mingles with that of the sulphur-spring, and, indeed, appears

* What Mr. Moseley describes as *Chroococcus* is apparently *Botryococcus Braunii*, Ktz. (see *infra*, p. 328). Mr. Archer detected no true *Oscillatoria* in the gatherings; the plant so called by Mr. Moseley is possibly a *Tolypothrix* (see *infra*, p. 332).

to supply a large share of the water of most of the hot springs, the water being merely heated and impregnated with various minerals &c. by the discharge of steam and various gases from apertures in the several basins into which it finds its way. Very little water flows away from these lake-springs, although the large basin in constant ebullition has the appearance of discharging large volumes of hot water. The small cool spring above referred to contains abundance of *Naviculæ* and other Diatoms, such as those met with amongst the green matter growing in very hot water. Specimens of these diatoms from this source were preserved in fluid.

Close by the hot sulphur springs are shallow pools of hot water, in the bottoms of which are holes of small size from which hot gases are constantly discharged together with some hot water. The bottom and edgings of these pools are of soft greyish mud. All round the edges is a thick brilliant green creamy deposit, which forms a tough cake on drying, and consists entirely of a *Chroococcus*. A similar bright green deposit was found coating the interior of some holes on the margin of the pools, from which a constant discharge of intensely hot gas was taking place. The water of the pool itself was so hot that it was not without difficulty that samples of the Algæ and water were got into a small bottle. A red incrustation which occurs round some of the fumerole apertures contains no Diatoms or other Algæ.

At the other set of hot springs at Furnas is a boiling sulphur spring, much like the one already described, but having its water rather muddy, and forming a transition to the regular mud-spring situate not far off. The walls of the cleft here are, as in the spring near the lake, covered with a thick vegetable deposit, which resembles the other in all respects, except that it contains more *Chroococcus*, and has a curious honey-combed appearance on the surface. In each case a considerable quantity of the mud or earthy deposit from the water enters into the composition of the incrusting mass.

Immediately below this hot sulphur spring is a sort of swamp of hot mud, with occasional small puddles and various openings discharging hot gases or water, and surrounded by crystals of sulphur &c. In this water, which was too hot to bear the finger, the same *Chroococcus* as observed at the springs near the lake was abundant, but, as in the former case, unmixed with *Oscillatoriæ*. A little lower down in a small pool of hot mud and water, so hot

that the finger could only be borne in it for a short time, grows a Sedge, specimens of which are forwarded with these notes*, and an abundant growth of Algæ, *Chroococcus*, *Oscillatoriæ*, and some Diatoms with endochrome complete.

The Algæ mentioned by Rabenhorst as being found growing in warm springs appear to be of similar forms to those found in the Furnas springs; Rabenhorst gives those of *Oscillatoriæ* as living under such conditions. *O. amphibia* occurs at Carlsbad in water from 96° to 104° F., *O. elegans* in very hot water at the same locality; and *O. gracillima* also occurs in hot springs (Rabenhorst, 'Flor. Eur. Alg.' sec. ii. p. 97). *Chroococcus membranensis* is further described as occurring with *Oscillatoriæ* at Carlsbad (Rabenhorst, *l. c.* p. 31). I have no works at hand from which to find out whether the Algæ form similar crusts in Carlsbad and elsewhere. They evidently grow in much hotter water at the Azores than at any of the German baths; and it is unfortunate that our party had no thermometer with them registering up to boiling-point, with which to test the actual temperature of the water from which the Algæ were gathered.

Hartung ('Die Azoren,' Leipzig, W. Engelmann, 1860, p. 173) gives the general temperature of the springs, after Webster ('Description of the Island of St. Michael,' W. Webster, Boston, 1821), as from 71° to 206° F., and those of the lake of Furnas as from 78° to 190° F. The water from which the Algæ were gathered was in the pools from which the *Chroococcus* was collected, as far as I can now judge, after testing water of successive temperatures with my finger, about 149° to 158° F. The water in which the sedges grow is from 113° to 122° F. The water of the sulphur-springs, in the area splashed by which the *Oscillatoriæ* are found, is quite scalding to the hand, and probably between 176° to 194° F. It would be interesting to grow *Oscillatoriæ* in some vessel and gradually subject them to higher and higher temperatures on a sand-bath to ascertain what amount of heat they would bear.

In a warm stream of about 95° F., trickling over rocks, was found a *Conferva* growing amongst the fibres of a moss.

In a cold iron-spring close to the hot springs at Furnas the grass-roots and sedges growing in the water are covered with a dense ferruginous deposit. This deposit is full of Diatoms.

In the lake of Furnas, near its margin, and at the end where

* They belonged to *Juncus acutiflorus*, see *infra*, p. 338.

the boiling springs are situate, are several patches where hot sulphurous gas is discharged through its water, rising to the surface in constant bubbles; and in some of these places small springs of hot water exist. The whole lake is rich in various Algæ; but these especially flourish around the patches where gas-discharges take place. Specimens of the Algæ are forwarded preserved in fluid. Amongst them are *Nostoc*, *Staurastrum*, *Oscillatoria*, *Hydrodictyon*—and many others, of which I failed to determine the genera. Under certain conditions the Algæ, mixed with the decaying remains of species of *Potomogeton* &c., form a sort of scum on the shore of the lake, which is left high and dry as the water recedes, and, under the action of the sun, passes into a peculiar tough sticky resinous-looking substance of a light brown colour, which may be gathered in pieces of considerable size. The substance has a strong smell of sulphur, and would probably, on analysis, be found to contain a good deal, since much sulphur must be precipitated in the lake-water by the sulphuretted hydrogen gas constantly discharged through it, and a scum on the surface would naturally pick this up. The substance, such as it is, appears to me of interest, since it seems, as far as I can remember, to resemble somewhat a peculiar elastic substance, a specimen of which is in the Kew herbarium amongst the lichens, and which is found on the shores of a lake in Australia. There is some doubt as to the origin of this substance; and it has been held to be a mineral, and Professor Maskelyne has specimens in the British Museum. The substance from the Lagos do Furnas may help to clear up the difficulty. There can be no doubt as to the origin of the specimens from Furnas. In some cases whole leaves of phanerogamic plants are included in it. It is perhaps found more developed and thicker at certain seasons. Such a substance could probably only be formed in volcanic lakes in the presence of peculiar chemical conditions in the water.

Some Algæ, Diatoms, &c., were collected in a mountain-stream near Furnas and in some fountains by the road-side. They are remarkably abundant, but apparently of familiar forms.

There had been three months' drought before our arrival at St. Michael's; hence Fungi were very scarce: I met with two only.

IV. Note on the foregoing Communication. By W. T. Thiselton Dyer, M.A., B.Sc.

[Read April 16, 1874.]

At the request of Dr. Hooker I submitted the materials collected by Mr. Moseley from the Azores hot springs to my friends Mr. W. Archer, of Dublin, and the Rev. E. O'Meara. The former examined them for chlorophyllaceous Algæ generally, the latter for Diatoms.

Mr. O'Meara has sent me the following Report:—

"Three specimens of material described as incrustations in hot-water springs contained no Diatoms whatever. A fourth specimen, very like India rubber in consistency, described as having been found floating in the lake, yielded a large number of Diatoms. The material burned like India rubber, and emitted a smell very similar to it. The diatomaceous forms contained therein were numerous, though not so much so as the material from Australia you were so good as to supply to me some time since.

"I examined, in addition to the above, four bottles which Mr. Archer had distinguished by numbers 1, 2, 3, and 4. No. 1, labelled by the collector 'from Furnas lake, Azores,' and No. 2, 'from the roadside-fountain on the way to Furnas, Azores,' abounded with Diatoms, and these such as are of most frequent occurrence in freshwater gatherings from similar localities in our own country. The collections which I was most anxious to examine were No. 3, 'from among sedges at Furnas in very hot water,' and No. 4, labelled 'Furnas lake, from area in which a constant discharge of hot gas takes place'—and that because one might anticipate that if any organisms occurred in such a condition, they might be somewhat different from the ordinary forms of animal and vegetable life, and also because the result might enable us to ascertain up to what temperature the lower forms of life, whether animal or vegetable, might be able to exist. No. 3 was found to contain *Oscillatoriaceæ* and other Algæ, as well as Diatoms, the latter not being numerous. Here I noticed, amongst other forms, *Nitzschia sigmatella*, Greg. In No. 4, Desmids were numerous, as well as *Dinobryon* in abundance. Several Diatoms also appeared—for instance, *Synedra lunaris*, Ehr., *Pinnularia gibba*, Ehr., *Himantidium arcus*, Ehr., *Cymbella affinis*, Kütz., *Gomphonema tenellum*, and *G. dichotomum*, Kütz.

These are all forms of common occurrence, and seemed in no way affected by the high temperature of the water. It is much to be regretted that the temperature of the water in which these forms were found was not ascertained."

I have collected in the 'Journal of Botany' for 1872, pp. 102–106 and 338–339, all the information which seemed obtainable about the curious substances to which both Mr. Moseley and Mr. O'Meara allude. They came from Coorong, near Adelaide, and were found in the hollows of a sandy desert. That mentioned by Mr. Moseley was of the consistence of India rubber, and contained a few Diatoms, but far fewer than the other material from the same place, which Mr. O'Meara found to be very rich in them.

There are numerous observations scattered through books of travel similar to those of Mr. Moseley. Thus Dr. Hooker found two species of *Confervæ* at the hot springs of Belcuppee, in the Behar hills, "in broad luxuriant strata wherever the temperature is cooled down to 168°" (Him. Journ. 2nd ed. i. 24); at the same place three *Cyperaceæ* grew with their roots in water of 100°. Dr. H. C. Wood, of California, has described two species of Algæ, *Nostoc calidarium* and *Chroococcus thermophilus*, both supposed to be hitherto unknown, as growing in the hot springs at Benton, of which the temperature was 160° F. Abel mentions an *Arenaria* which grew in soil the temperature of which was 110° F. (Voyage, p. 248). According to Schouw, *Cyperus polystachyus* and *Pteris longifolia* grow in Ischia in earth so hot that it burns the hand when an attempt is made to dig up the roots ('Earth, Plants, and Man,' p. 95). Sachs quotes also from Ehrenberg the statement that in the same region *Eunotia* and *Oscillatoria* occur in springs the temperature of which is 178°–185° F. Sachs has gathered together the bibliography of the subject in 'Flora' 1864.

V. Notes on some Collections made from Furnas Lake, Azores, containing Algæ and a few other Organisms. By W. Archer, M.R.I.A.

[Read April 16, 1874.]

The gatherings sent from Azores by Mr. Moseley were composed of materials put up in two ways—either by simply removing some of the mass in a lump and allowing it to dry, or by placing a small quantity in bottles with spirit.

The Algal forms to be found in the bottles might be roughly divided into:—those whose "specific" identity can be arrived at from outward characters alone; form-species—and such whose species could not be determined, though their generic position be quite certain, unless the examples showed fructification. Unfortunately, not one of the latter presented itself in the fertile state.

Judging, however, from general indications, and from the Algal forms falling under the former category, they are all of quite common-place character—that is, species of more or less frequent occurrence in our home (cool) waters. But this fact itself lends interest to these collections made so far away and, moreover, under circumstances of habitat so unusual.

Of the Algæ occurring in the fluid collections, many of which are of the minute "unicellular" forms, the majority are not, as one would have *a priori* anticipated they would be, *phycochromaceous*, but *chlorophyllaceous*, and this in water so *hot* as at least to be all but intolerable to the hands in making the gatherings. Besides Phycochromaceæ, however, Diatomaceæ likewise occur in most of them, all "common" species. Of the latter, the Rev. E. O'Meara will supply the particulars.

Of the form-species of chlorophyllaceous Algæ, that which is probably the most frequent in these gatherings is *Botryococcus Braunii* (Kütz.). Mr. Moseley isolated a quantity "pure" in one of the bottles; but it seems to occur in all. It is especially prominent in a bottle marked "Furnas Lake; from an area in which a constant discharge of hot water takes place." This is a frequent, often abundant, form at home. Notwithstanding, however, that there can be no doubt of the identity of the Alga in question, it is in itself quite an obscure production; the green cells are involved in a toughish mucous matrix, forming irregular clusters, the matrix, as it were, now and again pulled out so as to

make the little aggregate cluster appear as if composed of minor clusters cohering by threads of connecting mucus; these probably become disconnected by and by. Strings of colourless mucus sometimes stick out radially. The green cells pass into a red condition; but no fructification is known. Notwithstanding that the mucous matrix appears of a considerably tenacious character, so that the cells are difficult to dissociate, the several clusters do not show a tendency to combine on contact; they may be frequently found, on the contrary, as if equidistantly diffused, or, as it were, poised in the water, and at the same time forming long strings or bands stretching in different directions, at other times equally dispersed on the surface of submerged aquatics. This plant, not unfrequent in Ireland, has but two localities given for it by Rabenhorst; but it is probably pretty common in Europe.

In other bottles, generally marked from "*very hot*" situations, occur several very common forms appertaining to Pediastreæ—*Scenedesmus quadricauda, S. acutus, S. obtusus, Pediastrum granulatum, P. tetras, P. heptactis.* We also have *Polyedrium tetragonum,* only without the minute spines at the angles; is it distinct? At home *Polyedria* are scanty everywhere, some quite rare.

Another *common* form (that is to say, frequent in our home waters) is *Dictyosphærium Ehrenbergianum,* Näg. This does not seem abundant in these gatherings; but then the cells at the ends of the characteristic filiform stipites radiating from a common centre have a tendency to become removed, and the identity of the cells when isolated is rendered uncertain; however, in the fresh condition it is a very readily distinguishable form.

Ankistrodesmus (*Rhaphidium*) *falcatus* occurs sparingly. This is quite common as Irish, and, indeed, everywhere.

Not many Desmidieæ occur, either in number of examples or of species. The most frequent probably is an extremely minute form, *Arthrodesmus bifidus,* Bréb. This is very rare in Ireland, but has been taken so wide apart as counties Westmeath and Tipperary. Since its original record by de Brébisson, it has been found in one or two situations in Sweden by Lundell. It is, though so minute, a very constant and most distinct form. Probably the next most frequent form is a plane *Staurastrum* (*i. e.* compressed, and with but two rays terminating the angles in end view), which appears to be *new.* There is no evidence in the gathering of a triangular form of this species, though there can be no doubt that certain species ordinarily triangular are

occasionally compressed as well as multiangular, several Irish species affording examples of this variation—though only one Irish compressed species as yet has not presented its triangular form, whilst, however, a considerable number of typically triangular forms have occasionally shown their plane representatives. The next most frequent form in these gatherings, *Staurastrum tetracerum*, sometimes affords an example of the variation alluded to. Its ordinary plane (typical) representative is quite a common Irish form, whilst the triangular is rather rare; the former only occurred in these Azores gatherings. A minute *Staurastrum* coming near *S. glabrum* or *S. pterosporum* (its identity uncertain, not being conjugated) also occurs. Other Desmids are scanty; but the following occurred (arranged somewhat in the order of their decreasing frequency):—*Euastrum ansatum*, very few (quite common as Irish); *Penium digitus*, scantily (very common as Irish); *Cosmarium tinctum* (common as Irish). *C. bioculatum* (not very uncommon in certain places as Irish), *Staurastrum striolatum*, Näg.; *Cosmarium* (*Euastrum*) *venustum*, Bréb. (rather common as Irish); *C. Thwaitesii* (rare as Irish); further a very minute *Cosmarium* with a wavy or somewhat notched contour, as yet undescribed, but occurring in certain Irish stations; also *C. crenulatum*, Näg., very scanty (not common as Irish). Thus none of the larger or more striking Desmidieæ offered themselves—no large *Euastrum* or *Cosmarium*, not any *Micrasterias* or *Closterium*.

The next Alga which, owing to the comparative frequency of its occurrence in the gatherings and to its individual interest, claims notice, is one which, though appertaining to a genus and a group the specific characteristics of whose members mainly depend upon the fructification, comes rather under the category of a form-species, so little is known of its reproductive state. This is a *Coleochæte*, and indeed most probably the unnamed "seventh" species referred to by Pringsheim (but no more than referred to) at the very close of his fine memoir on this genus*. As there suggested, there can be but little, if any, doubt that this is the same as the presumed "young" condition of *C. scutata* spoken of by de Brébisson†, who founded this interesting genus. There can be no doubt, however, that it is quite a distinct thing, sometimes taken in our home waters in some comparative quantity, though

* "Die Coleochæteen," in 'Jahrbücher für wiss. Botanik,' Bd. ii. p. 36.

† Annales des Sciences naturelles, 3e sér. tom. i. p. 29, pl. ii. fig. 6.

of rather rare and certainly of local occurrence. It forms cells freely existent or occasionally cohering side by side in small numbers, of a globose figure tapering upwards, and surmounted by the neck-like process characteristic of the genus, bearing an extremely long bristle. This bristle seems to be continuous from its origin onwards; that is, the basal portion apparently does not open so as to form a sheath bearing the bristle protruding therefrom, but it passes off uninterruptedly into the bristle. There is, however, a rather well-marked point of transition, where the slightly tapering basal portion ceases and the extremely long and slender linear bristle-portion may be said to begin; the bristle does not appear to be jointed. A characteristic of *Aphanochæte* (Al. Braun) is the non-vaginated bristle; but certain of the species of *Coleochæte* (Bréb.), Prings., have non-vaginated bristles. Hence the present plant may safely be referred to *Coleochæte*, as indeed Pringsheim, granting the identity of the plants, has done. But one and the same cell often seems to bear more than one, it may be two, three, or more bristles (sometimes five or six). This appears to be due to a repeated evacuation of the older cell-wall and the formation each time of a new bristle; for every cell has at least one bristle. This *Coleochæte* might almost deserve to be called a "unicellular" form, but not in the strictest sense. Of a fructification nothing appears to be known, save the cursory observation chronicled in the Minutes of our Dublin Microscopical Club *, where it was shown that an elliptic fruit-like structure, surrounded by a sharply marked mucous coating, this latter at each end showing a very narrow depression wider at the outer surface than below, but seemingly inconspicuous or disappearing after a time, often occurs in close juxtaposition to examples of this pretty little form empty of contents. Although it has never been seen that the fruit-like body is actually formed from the emerged contents of the adjacent empty cells, the frequency of their concomitant occurrence renders the assumption all but certain, and that in this elliptic body we have at least a form of fruit of the plant, if, indeed, it be going as yet too far to call it an "oogonium," or an "oospore" destitute of an "oogonium" proper. Though such conditions could not be strictly denominated an "alternation of generations," yet we have here an interesting and curious separation, as distinct "individuals," of

* Quart. Journ. Micr. Sci. n. s. vol. ix. p. 424; Minutes Dubl. Micr. Club, May 1869.

the fruit from the plant itself. This form occurred in several of the Azores hot-water gatherings; but none showed the form of fructification here adverted to, being simply in the more frequently encountered barren (that is, merely vegetative) state.

Of Œdogonieæ one or two forms occurred, both of the genus *Œdogonium* (one a very slender, the other a coarser form) and of *Bulbochæte*; but as all appeared barren, their identity could not be made out; they could, however, hardly be doubted to be identical with forms occurring at home. One *Bulbochæte* is a tall-growing, long-celled form (of the habit of *B. setigera*, Prings.), the other a considerably shorter, nearly quadrate-celled form (more the habit of *B. gracilis* or *B. minor*, Prings.).

Of *Conjugatæ* (apart from *Desmidieæ*) a few unidentifiable forms presented themselves, none being conjugated. A single-spired *Spirogyra* of slender habit, and two others larger (probably *S. longata* and *princeps*), as well as a minute form (probably either a *Mesocarpus* or a *Staurospermum*), were in several of the fluid collections. But just as in the case of the *Œdogonieæ*, there would be no *à priori* reason to take them for any species different from similar ordinary *Conjugatæ* in our home waters.

Of Scytonematous forms a *Tolypothrix* occurred, possibly somewhat more slender than *T. distorta* so generally distributed. It is perhaps curious that an *Oscillatoria* proper did not seem to offer itself in the gatherings.

A small bottle was marked "Ferruginous Deposit growing on stems of *Cyperus*, from iron-spring, Azores." This, though very ferruginous in aspect to the eye, in the main proved to really represent an Alga, and, indeed, it could hardly be doubted, one and the same thing with the production some time since brought before the Dublin Microscopical Club under the colloquial designation of "animated sand;" so much do the little shapeless particles, when seen under a moderate power, resemble so many supposed rounded or worn quartzose granules, "animated" because when fresh and seen free in water they are prone to execute rather active movements of a perfectly automatic character, consisting of somewhat fitful, but vigorous, revolutions and gyrations, combined with an onward movement in different directions, up and down, "at random." This movement is not always evinced; sometimes the granules are perfectly quiescent. These little bodies present themselves of various sizes; the largest, indeed, is very minute, say about $\frac{1}{2500}''$ in diameter, and

of very variously lobed and irregular figure; they present a bluish subpellucid appearance in parts, again shining up with a reddish sheen as they revolve about. The more irregularly figured sometimes progress with more or less of a tumbling or wabbling gait, as if some prominent lobe might offer a certain amount of temporary difficulty to be overcome in rolling along. An examination under a higher power shows that each at first sight seemingly single "shapeless" granule is an aggregate of several extremely minute chroococcaceous cells held together by a common matrix or intercellular substance. A slight boiling in, or mere application of, potash solution breaks up these clusters into their constituent cells. Even when applied cold, the onward and revolving motion is at once stopped; and shortly the minute bluish cells become dissociated from the common matrix forming a bond of union, and the latter is left as a pellucid but evident residue, the little cells individually setting up a distinct "Brownian" or "molecular" motion, presenting little tremulously agitated clusters over the field. This familiar phenomenon is altogether a different thing, it need hardly be said, from the curious motion first mentioned: the potash put a stop to the first, and set the latter in action. No *cilia* or any thing like a propelling organ of any kind could be detected. Although the spontaneous movement of this little Alga differs in the mode in which it is evinced from that of *Bacterium* or *Vibrio*, it is most probably a manifestation of the same phenomenon. The action in *Bacterium* seems to be a "screwing" motion (that is, a revolution on its longitudinal axis), and of *Vibrio* a combination of this with an undulating motion. In the present plant it is as if a combination of a spinning and rolling motion, like that of a *Volvox*, but less measured. In like manner, the motion of *Vibrio* becomes stopped, the constituent cells broken up, by potash, the matrix disappearing, or at least not evident, and the individual cells setting up an independent molecular motion.

This little plant is not to be confounded, though no doubt very closely related, with another little Alga likewise showing the same kind of automatic movement (found in some of the deeper pools in county Westmeath). The cells of the latter, though not seemingly larger, form, however, larger groups; and, morphologically viewed, this Alga would seem to appertain to Nägeli's *Cœlosphærium*. The families are distinguished by a reddish colour, the bluish-green cells arranged at the periphery of the hollow

globular mucous basis. The whole possesses the power of moving vigorously about with a combined revolving and rolling motion, quite like a *Volvox*, though in not so graceful a manner; and, as before, there are no *visible* means of propulsion. Its action is now rotating, now spinning on its axis, now revolving, the while advancing, returning, quiescent, and anon renewing its motion in the same more or less fitful or interrupted manner. This plant occurs in company with other, no doubt closely "related," forms (which appear to be ever motionless), though not perhaps to be considered the same thing, morphologically viewed. Some nearly similar cells from the same locality, form besides irregular tabular expansions, also regular symmetrical strata (*Merismopædia*, sp. ined.) and larger irregular groups (approximating to *Clathrocystis*, Henfr.). However, until more (if ever it *can* be) be known as to the development of these lower phycochromaceous forms, these form-genera can be understood as simply names for types so retained as matters of convenience; and so it might indeed happen that of the two motile forms adverted to, the smaller, or that presumably the same as that occurring in the Azores gatherings, may be but a younger or smaller state of the larger globose (*Cœlosphærium*) form. The movements of *Bacterium*, *Vibrio*, &c. are, in their way, comparable to those of *Oscillatoria* and *Spirulina* themselves, and are possibly only a modification of one and the same phenomenon, whilst the character of the movement of the Algæ in question, though differing from the latter still more, may be due to the rounded, and not linear, form of the plants. Still, what the impelling force is seems not intelligible. It need not be said that the case is different with the ciliated zoospores of chlorophyllaceous Algæ. A closer parallel to the movements here drawn attention to seems to be afforded by the case recorded by Cohn, who found certain bodies which were to be, without doubt, regarded as separated portions of the (colourless) contents of a *Beggiatoa* set free in water, executing most vigorous, though not rapid, rolling and tumbling movements backwards and forwards in indefinite directions, and without displaying any apparent explanation of *how* the movements were effected*. These individualized masses, however, were seemingly larger than the colonies composed, in the globose form, of numerous minute cells, but which, when disunited, seem to lose their power of locomotion.

* Cohn: "Beiträge zur Physiologie der Phycochromaceen und Florideen," in Schultze's 'Archiv für mikr. Anatomie,' Bd. iii. p. 1.

Chroococcus minor appears frequent.

Amongst the gatherings made *en masse* and simply dried occurred a little darkish-coloured lump of a tough dense consistence, which, upon being cut with a knife, gave a tolerably smooth and clean surface, and appeared of a somewhat cartilaginous consistence. This was labelled as a moss, though not much was outwardly evinced of its character. Its tough and coarse and rather hard nature rendered it difficult to make a section of any value for examination. However, upon boiling a small slice in caustic potash and pressing it out, it was readily seen to consist mainly of a number of confervoid filaments firmly agglutinated in some manner; these filaments were thick-walled, jointed, the joints some four or five times longer than broad, the septa directly transverse. The contents in the ordinary state were nearly colourless, or more probably had been to a great extent deprived of colour by drying; but they mostly showed an orange- or buff-colour when treated with potash. Commingled amongst the mass mainly produced by these filaments, occurred a number of stems of an unidentified moss, as well as a considerable number of a puzzling-looking one- or two-celled organism with very thick shining pellucid walls and chlorophyl contents, and of a bluntly angular outline, generally irregularly triangular, but sometimes of quadrate or rhomboid figure; sometimes these cohered in "strings" composed of two, three, four, or even more individuals attached one to another by a short process from one of the adjacent angles of each. These, at first sight, had no little appearance of a new and distinct algal form; except that they showed a transverse septum, they were calculated to make one for a moment fancy that a new form of *Polyedrium* (Näg.) was before one. However, upon a closer examination, it was readily seen, as just mentioned, that many of the examples showed a transverse septum, nearly always nearer one end (the smaller) than the other, thus cutting the cell into two unequal portions; they therefore could not belong to *Polyedrium*. It is curious that none were noticed in which the division was carried to a more advanced stage, unless, indeed, the coherence of a few in chains was the expression, as most likely is really the case, of a further self-division fully carried out. Now this form calls at once to mind the similar, though not seemingly identical, growth once brought before our Microscopical Club *, which was taken by me

* Quart. Journ. Micros. Science. n. s. vol. vii. p. 176. Minutes of Dec. 1866.

in a pool in the Dublin mountains. That plant, it was then quite plain, was no *Polyedrium*; and though it was by no means so plain that we might not have therein an Alga (possibly new and *sui generis*), I felt at the time that it was most probably not so, but an "alternation" (if the term be allowable or applicable) of something else. That idea would seem to be confirmed by the examples in Mr. Moseley's gatherings. I supposed that into this solid clump of material a foreign Alga could hardly gain access in quantity, and began to suspect a genetic relation of this curious-looking little growth with the moss. After repeated slices and boilings I found it to be so; that is, I found that the upper and outer cells of certain *branches* or young leaf-like outgrowths given off from the moss-stem became by degrees changed, first, from their ordinary elongate truncate shape to more or less rounded, then gradually assuming towards the ends the angular and irregular figure, when they *dropped off* as the puzzling-looking and problematic angular quasi-algal growths; that is to say, the cells which would have formed some leaves became gradually modified and detached as these peculiar "gemmæ." I cannot now but suppose that the growths found (in water) in 1866 were equally but a peculiar gemma-formation from some other moss—not the same moss as the present, because there were differences *in themselves* between the one and the other of these problematic structures. Seen by themselves, these little growths (which, by the way, are very pretty) are sufficiently calculated to mislead, as they look so *like* probable independent *algal* forms, whereas they really represent each a form of "moss-gemma" which I am not aware has been noticed. It is therefore probable that likewise the filamentous growth forming the great mass of this material also appertains to the moss, and is in fact what might once have been called a "*Protonema*." The septa, however, are not oblique; and the mode in which the filaments are so densely compacted is remarkable. To a certain extent they seem to show a resemblance to such a plant as *Chroolepus aureus* (apart from the colour, though it is curious how like in that respect to that plant the potash makes a preparation from the Azores example); but to suppose this rather a "*Protonema*" would seem to be a more natural solution.

Amongst the crusts taken from the margin of the lake occurred a plant in general appearance very like *Ainactis alpina*; in some parts of the mass the very slender central series of contents of

the threads were included in a comparatively wide tube, at other times without this, and in the latter case contorted about in an irregular manner, forming a tangle, thus offering a peculiar aspect; yet still the crust appeared to be zoned or stratified, the upper outer region being denser. Another was very close to, if not identical with, *Phormidium smaragdinum*, Kütz. The very remarkable caoutchouc-like substance abounds with diatoms, apparently of commonplace character, of which Mr. O'Meara has written.

But in these hot-water gatherings Algæ were not the only organisms which were to be detected (if, indeed, only by their remains), and, moreover, quite specifically identical with their representatives occurring in our own home cool waters. It is quite possible that the remains even of others may have become destroyed or obliterated, such as soft or shelless Infusoria. It is perhaps curious that not any remains of Entomostraca seemed to occur.

Of Flagellata, *Dinobryon sertularia* was abundant in one gathering, and was met with sparingly in others, also a *Trachelomonas* and a *Peridinium*; but it would seem that the existence of these would not have been apparent but for the remains of their urceoli. But the animal forms which best rendered their specific identity evident were a few of the more common Rhizopoda, as their tests retained their ordinary characteristics; they were, however, not frequent, and the number of species few, so far as met observation. Those whose identity was certified by their tests were *Euglypha alveolata*, *Trinema acinus*, and *Echinopyxis* (*Arcella*) *aculeata*, all common at home. There occurred, besides these, other less-frequent forms, whose remains were less recognizable, and their identity therefore questionable. One of these was a form conjecturally the same as *Pleurophrys fulva*, Arch.; and another single example, somewhat crushed, resembled *Difflugia mitriformis* or *D. acuminata*, Wallich. Some few examples of yet another form occurred, which I am not, indeed, aware has been hitherto recorded. It is one not *very* uncommon in certain localities in this country; but it has to be sought for somewhat diligently. One may be told that it is but a mere form of *Difflugia globularis*, Wallich, or *D. symmetrica*, Wallich; but I could not think so. In those forms Wallich's figures * show their test to be made up of quartzose or other granules impacted

* Ann. Nat. Hist. ser. 3, vol. xiii. p. 384 (March 1864), pl. xvi.

in the most regular manner, so as to form a globular test, which would hold compactly together long after the death or removal of the sarcode body. Moreover it may be safely said that all *Difflugiæ* are prone to project and withdraw the hyaline finger-like sometimes branching pseudopodia in an ever fitful and more or less active manner, often in a few moments even after the shock of removal from a gathering to a slide. In the present form, which is globular, and considerably below the size of any ordinary *Difflugia*, the body is surrounded by a scattered, very irregularly and loosely aggregated quantity of foreign granules, not sufficient to form a compact "test," leaving, indeed, seemingly distances between them; there is a somewhat definite region where the body seems wholly without them. Thus, if we were to suppose the sarcode body capable of being removed and leaving the outer particles behind, they would simply collapse into a mere irregular cluster. Further the sarcode body is *extremely* reticent in allowing any pseudopodia to become projected; rarely, however, one can observe a short conical stump-like process (or even more than one) slowly extending, and ere long disappearing; there is a nucleus present. Such a lifeless-looking and inert object as this might be readily enough, and probably often is, passed over as some nondescript or inorganic thing, or a mere cluster of "dirt," accidentally globular in figure; but, for all that, it is a form of life, or some phase of one, again and again recurring; nay, it must be accounted a Rhizopod; but whether really a *Difflugia* may be questionable. Be its identity whatever it may prove to be, there is but little doubt that just the very same thing occurred, very scantily indeed, in the Azores gatherings.

Possibly the seeming absence is remarkable of forms so common at home as *Arcella vulgaris*, *Difflugia pyriformis*, and *Difflugia spiralis*, seeing that the three before-mentioned forms are apparently not more widely distributed at home.

Enclosed in the parcel was a *Juncus* too (not a sedge), which grew in "warm water;" Dr. Moore and Mr. More cannot distinguish any important distinctions from *Juncus acutiflorus*.

We have thus, as seen, a number of microscopic forms sufficiently frequent at home found growing in these hot waters. It is to be regretted that we have not a record of the precise temperature of the parts whence the gatherings were taken. Mr. Moseley seems to allude in his communication to a previous record of

the temperature of Furnas Lake; from 71° F. in some parts to as high as 194° F. in others. Can it be possible that any of these things could have lived and flourished in its hottest parts, admitting the highest temperatnre quoted to be correct? A reply to this inquiry would be interesting in its *possible* bearing on the mooted point as to the temperature beyond which *Bacteria* or their "germs" will not survive. At least the temperature of the places whence the collections were taken was high, as in making the gathering Mr. Moseley could with difficulty bear his hands in the water (one takes at some seasons at home identical forms living and flourishing in waters in which one can hardly bear one's hands from precisely the opposite reason!); and although they lived there and flourished in so hot a medium, it is probable that the same species gathered at home, if ever so gradually raised to the point of the temperature of Furnas Lake, would perish under the treatment, or might indeed absolutely become thereby capable of being kept as permanent "preparations." Nordstedt has presented a noteworthy communication to the "Botaniska Notiser"*, stating that he has found the application of heat an effective means of preserving some of the delicate Algæ, and even of retaining the characteristic arrangement of the endochrome. In the summer of 1870 he met with the rare and interesting Alga *Sphæroplea annulina*, which has the chlorophyl arranged in the sterile cells in bands or rings. In endeavouring to dry the examples he found that these rings became wholly lost; he tried different preservative fluids, without satisfactory result, and then he tried heating. He set a little bottle containing the Alga in water upon a dark background and exposed it to strong sun-light; the Algæ thus dried were found to have retained the rings very well. He then tried some experiments in heating by means of a spirit-lamp; and by the use of a thermometer he came to the following results:—

½ a minute's exposure to	95°–113° F.	The rings were not found preserved when dried.
5–10 minutes exposure to	95° F.	The rings were well preserved.
½ " "	122°–208° F.	
10 " "	140° F.	The rings were detached from the margins and laid along the cell.
2 " "	208° F	

* "Om användandet af värme vid prepareringen af en del gröna alger," in 'Botaniska Notiser,' No. 1*a*, Jan. 1871, p. 9.

The author adds that probably the best is to apply 113° to 122° F. for a couple of minutes' time, also that even *Spirogyræ* thus treated preserve their spiral chlorophyl bands more or less well —being of the opinion, however, that different species require different degrees of heat.

It is very interesting, then, to find just similar species living and growing in Furnas Lake in a normal and characteristic condition, in temperatures probably very little, if at all, under those quoted by Nordstedt as successfully employed by him to "kill" and make a permanent preparation of the examples submitted thereto. Mr. Moseley suggests the growing of Oscillatoriaceous plants gradually submitted to more and more elevated temperatures, to see what degree of heat they could withstand without injury or death; but in the Azores material there were *not only* phycochromaceous Algæ, as might have been *a priori* expected, but likewise chlorophyllaceous forms, as well as flagellate and rhizopodous organisms, all living in good condition together and in the same "hot water."

VI. Notes on Plants collected at St. Vincent, Cape-Verdes (July 27th to August 4th, 1873). By H. N. MOSELEY, M.A., H.M.S. 'Challenger.'

[Read April 16, 1874.]

THE island of St. Vincent is about twelve miles long by six broad. It has an irregularly oval form, and consists of a flat central tract more or less broken by low hills, surrounded by a range of high land. The low central district is evidently the bottom of an ancient crater, of the wall of which the high surrounding range is the remains. The range is composed of strata dipping outwards from the ancient centre of eruption. It is cut up by a series of deep valleys having a general radiate arrangement, into ridges of various heights, which are again cut up by secondary transverse valleys so as to culminate in a series of irregular peaks. Some of the ridges are of considerable height. The Green Mountain is 2483 feet in height; and one other mountain, to the extreme south of the island, 2218 feet. A large proportion of the hills are much lower, ranging from 700 to 1200 feet. A break in the surrounding range to the north-west forms the harbour of Porto Grande, in the mouth of which is a small island called Bird

Rock, a fragment of the range once continuous in this direction. At the time of our visit to the island there had been no rain for a year, and its appearance, as approached from the sea, was that of utter sterility, the rocks being black and bare, and the low hills covered with a bright red volcanic soil, which looked peculiarly arid and parched. The general look of the place was not unlike that of Aden or of some of the volcanic islands in the Red Sea. From the anchorage in Porto Grande some black tufts could be made out with some difficulty with a glass, which consisted of the small bushes of *Lavandula* (*L. rotundifolia*, Bth.), the most abundant plant in the island. On the summit of the higher hills a few *Euphorbia* (*E. Tuckeyana*, Steud.) bushes could be discovered in the same way. On the sandy plain stretching up from the shore inland is a thick growth of Tamarisk (*T. gallica*, L.) bushes, amongst which, at about half a mile from the shore, is a group of some half dozen small trees. These trees consist of a Tamarind (*Tamarindus indica*, Linn.), some thorny Acacias (*A. albida*), and a tree with white flowers on spikes (*Terminalia Catappa*, Linn.). They stand in an old enclosure in front of the ruins of a house, and, though not large (the largest, the Tamarind, being about 9 inches in diameter in the trunk), are green and flourishing, and show that much might be done by cultivation even in St. Vincent. In the description of St. Vincent in Horsburg's 'Directory' it is stated that "as much wood may be cut here in a short time as can be stowed away." It is possible, therefore, that there was at one time more vegetation on the island, and in consequence more rain. Near the shore a few succulent plants grow, and the dunes of calcareous sand are bound together by a coarse grass, apparently the same species that grows in a similar situation at Bermuda. The plains were covered all over with the spring fruit of a small creeping plant (*Tribulus cistoides*, L.) and another plant with downy seeds, both of which were chip-dry. Almost the only plants retaining any living and green leaves were the Lavandulas, on which was here and there a green sprout, put forth apparently in anticipation of the wet season. Plants of a small grass absolutely dry and brittle, but in full fruit, were also to be found on the plains. The island is said to become green after rain as if by magic; and at San Jago, where the rain had been earlier, the plains at about 500 feet elevation were covered with a splendidly green coat of seedlings; but a day's moderate rain, which oc-

curred on July 30th, had not produced any visible effect by August 5th, on which day we sailed. The bottom of the valleys and hill-slopes to the southward are covered with a dry hay-like grass; but the goats and cattle kept in this part of the island were dying in numbers from starvation.

As the hill-slopes are ascended from the plains, the plants become greener and more abundant. In ascending the Green Mountain I passed some small gardens in a narrow gorge at the commencement of the ascent. The gardens were at an elevation of about 200 feet above the sea-level. They contained sugar-cane, pumpkins, and a small date-palm; and maize was just being planted in them. There were a few cotton-bushes growing near. At 700 feet Euphorbias and the woody Composites commenced, and the hill-side was covered with coarse dry grass. At 1000 feet the small boraginaceous bushes (*Echium stenosiphon*, Webb) with pink flowers commenced. At 1300 feet I found the first patch of moss and *Marchantia*, with a fern and a helix. At 1700 feet a *Statice* (*S. Jovis-barba*, Webb) was abundant on the cliff. The *Lavandula* grows right up to the top of the mountain, but is there fresh and green, instead of black and withered as below. The leafless trailing Asclepiad *Sarcostemma* (*S. Daltoni*, Dcne.) commenced at about 900 feet. I could not find a single plant of this species in blossom on the Green Mountain, but found one single inflorescence on an isolated plant growing at an elevation of 900 feet in the south-west of the island. At St. Jago the same plant grows on the cliffs close down to the sea, and at the time of our visit (August 7th) was there in full blossom, the season being much further advanced than in St. Vincent. All the plants which I saw on the Green Mountain appear to grow up to the summit. On the summit the land is all more or less under cultivation, maize, pumpkins, potatos, tomatos, &c. being grown there. With the seeds of these a considerable number of weeds has probably been introduced. The tomato appears to have run wild. I found it, apparently wild, dwarf, covered with fruit. Near a cottage, at about 2000 feet, is a double circle of large Agaves. Almost the whole of the inner circle (that is, about seventeen plants) had flowering spikes shooting out and already about 10 feet high.

The combination of effects due to difference of aspect with regard to the trade-wind and sun produces a marked difference in the altitudes at which plants can grow at various aspects in St.

Vincent. Thus *Aizoon canariense*, Linn., and a malvaceous plant, which on Bird Rock grow close to the sea-level on its windward and shady side, do not commence on the leeward sides of the hills of the main island till 700 or 800 feet. The *Euphorbia* shrubs and low woody Composites usually commence at about 800 feet elevation on the leeward sides of the hills, reaching down nearly to the sea on the other; but some *Euphorbia* bushes struggle down in the bottoms of dry water-courses to 200 feet on the leeward sides of the hills. And in one valley near the harbour, sheltered from the wind but shaded from the sun by its very steep almost perpendicular sides, and moistened by the close proximity of the mountain 1595 feet in height, the *Euphorbias* and Composites come right down to sea-level; but this is extremely exceptional. On the mountains on the southern side of the island the vegetation does not come so far down the windward slopes, since the wind is heated and dried before reaching them by passing over the hot central plain.

On the cliffs on the weather-side of the island I fouud a small yellow-flowered Crucifer (*Sinapidendron Vogelii*, Webb) and a patch of a small plant with white flowers (*Samolus Valerandi*, Linn.) growing round a small spring. The patch was about 4 feet in circumference and quite isolated; it absorbed the whole of the water yielded by the scanty spring. I saw this plant nowhere else in St. Vincent; and there is hardly any other spot where it could grow. It is abundant, however, by the stream in San-Domingo valley in St. Iago.

On Bird Island I found nine flowering plants all occurring also on the main island, but growing here at a lower level.

The rocks about tide-mark are covered with a broad band of a dense incrustation composed of calcareous Algæ, which forms a striking feature in the appearance of the island as seen from the sea, and is especially marked on Bird Island. This incrustation is of several colours, white, bright pink, or cream-colour. It assumes very varied forms, being simply incrusting, and following the form of the rock-surface on which it rests, or forming smooth rounded convex masses, or being covered with a close-set series of projections, sometimes of considerable length and with a sinuous arrangement. The incrustations are bored by mollusks such as *Lithodomus candigerus*; and the cavities between them and the rock are filled with small sponges and *Bryozoa*. I collected specimens of those variously shaped incrustations, and have placed

with them a specimen of the fossil nulliporic nodules which abound in the curious limestone-bed described by Darwin in his 'Volcanic Islands' as existing in the cliffs of St. Iago.

At St. Vincent as complete a collection of plants as possible was made, every day being spent in search for specimens. At St. Iago the stay was very short, and only a few plants which happened to be met with were collected, those especially being chosen which had not been procured at St. Vincent. An attempt to ascend the high mountain of the island failed. Some water-plants and two ferns were gathered on the banks of the stream in San-Domingo valley.

VII. Enumeration of Algæ collected at the Cape-Verde Islands by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.' By Prof. G. Dickie, M.D., F.L.S.

[Read December 18, 1873.]

St. Vincent (in shallow water):—

Fucaceæ.

Sargassum vulgare, *Ag.*
Geog. distr. Tropical and subtropical Atlantic; Spain; Portugal; Manilla; Mauritius.

S. rigidulum, *Ktz.*
Geog. distr. Rio Janeiro.

Cystoseira abies-marina, *Turn.*
Geog. distr. Mediterranean; Azores.

Dictyotaceæ.

Padina pavonia, *L.*
Geog. distr. Widely diffused in both hemispheres.

Asperococcus sinuosus, *Roth.*
Geog. distr. Mediterranean; Brazil; Gulf of Mexico; Red Sea; Mauritius; Australia; Falklands.

Chordariadeæ.

Mesogloia brasiliensis, *Mont.*
Geog. distr. Brazil.

Ectocarpaceæ.

Ectocarpus simpliciusculus, *Ag.*
Geog. distr. Mediterranean.

Rhodomelaceæ.

Polysiphonia obscura, *J. Ag.*
Geog. distr. Britain; Spain; Gulf of Mexico.

P. villum, *J. Ag.?*
Geog. distr. Shores of tropical America.

None of the specimens examined had fruit of any kind, and I attach some doubt.

Laurenciaceæ.

Laurencia obtusa, *Lamx.*
Geog. distr. Britain; Mediterranean; Florida; California; Mauritius; Java; Philippines; Tahiti.

Lomentaria parvula, *Ag.*
Geog. distr. Britain; Spain; Mediterranean; N. America; Bencoolen.

Corallinaceæ.

Jania cubensis, *Ktz.*
Geog. distr. Gulf of Mexico.

Amphiroa fragilissima, *L.*
Geog. distr. W. Indies.

Melobesia pustulata, *Lamx.*
Geog. distr. Britain; Mediterranean; Japan; Bencoolen; Norfolk Island.

Lithothamnion polymorphum, *L.*
Geog. distr. European shores of Atlantic and Mediterranean; Algoa Bay.

L. mamillare, *Harv.*
Geog. distr. Bahia; Algoa Bay.

Sphærococcoideæ.

Gracilaria multipartita, *Clem.*
Geog. distr. England; Spain; France; United States; Indian Ocean.

Gelidiaceæ.

Gelidium corneum, *Huds.*
Geog. distr. In various forms widely spread in both hemispheres.

Caulacanthus rigidus, *Ktz.*
Geog. distr. Senegal.

A few tufts only, but agreeing in structure and general characters.

Wurdemannia setacea, *Harv.*?
Geog. distr. Florida.

The few specimens are growing on *Lithothamnion*, and have the general structure described in 'Nereis Boreali-Americana;' but not having seen authentic specimens, I have marked the plant doubtful.

Squamarieæ.

Peyssonnelia Dubyi, *Crouan.*
Geog. distr. France; Britain; Florida; W. Indies.

Helminthocladieæ.

Galaxaura lapidescens, *Lamx.*
Geog. distr. W. Indies; Madagascar; Amboina.

G. cylindrica, *Lamx.*
Geog. distr. Red Sea; W. Indies.

G. rugosa, *Lamx.*
Geog. distr. W. Indies; Mauritius; Gambier Islands.

Rhodymeniaceæ.

Plocamium biserratum, n. sp. Fronde ecostata, decomposite pinnata, pinnis alterne ternis vel geminis, inferiore sublanceolata, extrorsum convexa et biserrata; sporophyllis decomposite dichotomis, apicibus bifidis.

Rhodymenia Palmetta, *Esp.*
Geog. distr. England; Spain; Sicily; Adriatic; Azores.

Spyridiaceæ.

Spyridia aculeata, *Ktz.*
Geog. distr. Spain; Mediterranean; Vera Cruz; Red Sea.

Cryptonemiaceæ.

Ahnfeltia concinna, *J. Ag.*
Geog. distr. Coast of Peru; Sandwich Islands.

Chondrus elongatus, *Mont.*
Geog. distr. Chili.

I have not seen authentic specimens of either of these two Algæ; but both agree in structure and general characters with descriptions and figures.

Kallymenia schizophylla, *Harv.*
Geog. distr. Cape G. Hope.

The above remarks apply also to this plant, of which there are two specimens apparently perfect and one fragmentary, but no fruit.

Ceramiaceæ.

Centroceras hyalacanthum, *Ktz.*
Geog. distr. Cape Comorin; Isle of Bourbon; Philippines; Tahiti; W. Indies.

C. cryptacanthum, *Ktz.*
Geog. distr. Shores of Mexico.

Siphonaceæ.

Caulerpa mexicana, *Sonder.*
Geog. distr. Gulf of Mexico.

C. pectinata, *Ktz.*
Geog. distr. Venezuela.

Halimeda Tuna, *Lamx.*
Geog. distr. Florida; Mediterranean.

Codium tomentosum, *Ag.*
Geog. distr. Widely spread in both hemispheres.

C. adhærens, *Ag.*
Geog. distr. England; Spain; Mediterranean; Canary Islands.

Valoniaceæ.

Valonia verticillata, *Ktz.*
Geog. distr. Santa Cruz.

Ulvaceæ.

Ulva lobata, *Ktz.*
Geog. distr. Chili; Japan.

Enteromorpha compressa, *Grev.*
Geog. distr. Widely distributed in both hemispheres.

Porphyra laciniata, *Ag.*
Geog. distr. Widely diffused in both hemispheres.

Kallonema cæspitosum, n. sp.* Fronde inferne subcompressa irregulariter ramosa; ramulis alternis e cellulis laxe connexis formatis.

Forming small tufts mostly ½ an inch in height, and pale green. In rock-pools with *Ectocarpus* and *Lyngbya*. It is probable that the one found at Fernando Noronha (*K. obscurum*) may be fragments of this same plant.

Confervaceæ.

Chætomorpha pachynema, *Mont.*
Geog. distr. Canary Islands.

Oscillariaceæ.

Lynbya ferruginea, *Ag.*
Geog. distr. Shores of Europe; United States; Tasmania.

L. fulva, *Harv.*?
Geog. distr. Shores of the United States.

Leptothrix cæspitosa, *Ktz.*
Geog. distr. General in Europe.

Forming a tough felted stratum in a spring 200 feet above the sea, N.E. aspect of cliffs.

Palmellaceæ.

Pleurococcus vulgaris, *Menegh.*
Geog. distr. Frequent in Europe.

Chlorococcum ellipticum, n. sp. Cellulis ellipticis, singulis; cytiodermate hyalino distincto; cytioplasmate saturate viridi.

Diameter of the entire organism is ·001 by ·0016 of an inch. These two were found with the following Diatoms among the *Leptothrix*.

Diatomaceæ.

Melosira orichalcea, *Mert.*

* The genus *Kallonema* was instituted to include a fine species allied to *Enteromorpha*, see Linnean Society's Journal, vol. xi. p. 457.

NAVICULA APIS, *Ehr.*

N. NODULOSA, *Ktz.*

EPITHEMIA ARGUS, *Ktz.*

E. GIBBERULA, *Ktz.*

ST. IAGO.

DICTYOTACEÆ.

DICTYOTA BARTYRESIANA, *Lamx.*
Geog. distr. Indian Ocean; Gulf of Mexico.

D. DENTATA, *Lamx.*
A single imperfect specimen; a broad variety.

GELIDIACEÆ.

HYPNEA DIVARICATA, *Grev.*
Geog. distr. Australia; Gulf of Mexico.

H. PANNOSA, *J. Ag.*
Geog. distr. Mauritius; Mexican Coasts.

CONFERVACEÆ.

CLADOPHORA FASCICULARIS, *Mont.*
Geog. distr. Shores of the Gulf of Mexico.

Mr. Moseley sent a single specimen of the fossil "Nullipore" from the limestone bed near Porto Praya, alluded to by Mr. Darwin in his work on Volcanic Islands; his conjecture as to its nature seems to be quite correct. It appears to partake of the characters of *Lithothamnion racemus*, Lam., and of *L. Brassica-florida*, Harv., but is too much abraded for precise identification.

VIII. Enumeration of the Fungi collected during the Expedition of H.M.S. 'Challenger', Feb.–Aug. 1873. By the Rev. M. J. Berkeley, M.A., F.L.S.

[Read April 16, 1874.]

Teneriffe, Feb. 1873.

1. Agaricus (Mycena).

In the absence of all information it is impossible to determine the species.

3500 feet.

2. Agaricus (Crepidotus) variabilis, *P.*

On *Erica arborea.* 3500 feet.

3. Agaricus (Mycena) corticola, *Schum.*

On dead wood.

4. Agaricus (Panæolus) papilionaceus, *Bull.*

On dung.

5. Agaricus (Flammula) flavidus, *Schæff.*

On the ground, but possibly growing above concealed wood.

6. Stereum hirsutum, *Fr.*

On old sticks. 3500 feet.

7. Clavaria flammans, *B.* Cæspitosa aurantiaca sursum incrassata obtusissima; mycelio cinnabarino.

On the ground. 3500 feet.

This has undoubtedly a close relation to *C. inæqualis*; but I have never seen in any variety of that species any thing like the brilliant mycelium which is so conspicuous in this. About $1\frac{1}{2}$ inch high.

8. Tremella mesenterica, *Retz.*

On *Cytisus Retama.* The conidiiferous state. 6000 feet.

9. Crucibulum vulgare, *Tul.*

On dead twigs. 3500 feet.

10. Isaria floccosa, *Fr.*

On the larva of some insect in the neighbourhood of *Cytisus Retama.* 6000 feet. About 2 lines high.

A single specimen only.

11. Peziza coccinea, *Jacq.*

On dead wood. 3500 feet.

12. Peziza firma, *P.*

On dead wood. 3500 feet.

13. Helotium æruginosum, *Fr.*
On *Cytisus Retama.* 6000 feet.

Merely a dead twig stained with the mycelium.

Bermuda, April 1873.

14. Agaricus (Galera) tener, *Schæff.*
On the ground.

15. Agaricus (Entoloma).

A single specimen only, in very bad condition. It belongs clearly to the same section as *Agaricus nidorosus*, of which it has the irregular spores.

16. Agaricus (Eccilia) rhodocalyx, *Lasch.*
On the ground.

Occurs also in Cuba.

17. Agaricus (Mycena) corticola, *Schum.*
On dead wood.

18. Agaricus (Panæolus) papilionaceus, *Bull.*
On dung.

19. Marasmius obscuratus, *B. & Br. Linn. Journ.* xiv. p. 38.
On bark.
Either opaque or transparent, minutely pulverulent, gills broad.

I can find no distinguishing character between this and the Ceylon species.

20. Stereum lobatum, *Fr.*
On dead sticks.

A small resupinate form.

21. Polyporus obliquus, *Fr.*
On dead sticks.

22. Uredo Vincetoxici, *DC.*
On leaves of Oleander.

23. Lycogala epidendrum, *Fr.*
On fern (*Osmunda*). Abundant.

24. Hypoxylon multiforme, *Fr.*
On decayed wood.

25. Sphæria mammæformis, *P.*
On dead sticks, both on the bark and on the wood.

In the former case looking very like a *Verrucaria.*

26. Asterina pelliculosa, *B.*
On coffee leaves.

Besides the species enumerated, there is a minute black fungus on very old *Opuntia*, which is entirely without fruit, and in consequence the genus is doubtful. The same may be said of something like an *Helminthosporium*.

St. Thomas.

27. Lentinus villosus, *Fr.*

Two small specimens, one of which is pale and the more ordinary form of *L. villosus*, the other darker and approaching nearer to *L. fumosus*, Lév., or *L. stuppeus*, B.

28. Schizophyllum commune, *Fr.*

The ordinary form.

29. Hirneola hispidula, *B. Ann. Nat. Hist.* iii. p. 396.
On dead branches.

30. Reticularia polyporiformis, *B.* Crassa, polyporoidea; fibris erectis laciniatis; sporis versiformibus lateritiis.

Spreading for some inches, one or two thick, at first looking like a diseased *Polyporus*, or *Anixia*; spores extremely variable in size, sometimes globose with a very short obscure pedicle, sometimes lemon-shaped and distinctly pediculate, sometimes entirely misshapen. Its nearest ally is the Cuban *R. pyrrhospora*, *B. Linn. Journ.* x. p. 347.

31. Polyporus sanguineus, *Fr.*

One of the commonest fungi in tropical countries. There is also a bleached state amongst the specimens.

32. Polyporus pinsitus, *Fr. El.* p. 95.
On dead sticks.

33. Trametes hydnoides, *Fr.*

A common tropical species.

St. Michael's, Azores. July 1873.

34. Agaricus (Psathyrella) crenatus, *Lasch. in Linn.*
On the ground.

A single specimen agreeing in so many points with the species of Lasch., that notwithstanding some slight differences, in the absence of entire information as to colour when fresh, it does not seem

advisable to describe it as distinct. At first sight it agrees with *Coprinus pilulifer*, Plant. Can. tab. 4. fig. 6; but that is extremely deliquescent, and the same remark applies to *Coprinus radiatus*, with which it agrees as regards the creeping rootlets.

Pileus hemispherical, somewhat umbilicate, rufous when dry; margin sulcate; stem white, furfuraceous, with creeping fibrils at the base; gills broad, black, with a white margin; spores elliptic, obtuse, or slightly lemon-shaped, ·00057–·0006 long.

I did not observe any prominent cystidia.

35. Bovista plumbea, *P.*

On the ground.

A single specimen.

St. Vincent, Cape-Verdes. Aug. 1873.

36. Cladosporium oligocarpum, *Cd. Ic.* i. tab. 3. fig. 208.

On leaves of some Malvaceous plant.

This seems to be the same as Corda's plant, though it is very difficult to speak positively without authentic specimens. The spores, indeed, are longer; but nothing is more variable than the length of the spores in the genus. It differs obviously from *C. herbarum* in the much narrower spores, which are uniseptate and about ·0008–·0005 long. The threads are slender, irregular, but not nodulose; and the spores, few in number, appear to be developed at the tips of the threads.

St. Iago, Cape-Verdes. Aug. 1873.

37. Agaricus (Pleurotus) Moselei, *B.* Pileo flabelliformi subtiliter reticulato fimbriato e rufulo pallescente; stipite brevissimo; lamellis latis distantibus decurrentibus interstitiis lævibus.

On dead wood. St.-Domingo valley.

Pileus $2\frac{1}{2}$ inches across, $1\frac{1}{2}$ long, fan-shaped, with the margin at first nearly even, then strongly fimbriate, decurrent at the base, where it forms a very short stem, at first cinereo-rufous, then pale, marked in a reticulate manner with very fine lines, the remains, apparently, of a slightly gelatinous coat; stem rudimentary, tomentose.

In one specimen a thin white stratum runs down from the base of the stem. Amongst the numerous species in my herbarium I do not find one which accords with this. The last specimen, with an entire margin, bears some resemblance to *A. nidulans*; but the gills are far broader.

38. Agaricus (Naucoria) vervacti, *Fr.*
On the ground. St.-Domingo valley.
Spores elliptic pale, ·0006 long.

39. Marasmius ramealis, *Fr.*
On decaying rootlets.

IX. Notes on Plants Collected at St. Paul's Rocks. By H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger'.

[Read April 16, 1874.]

Darwin in his 'Naturalist's Voyage' describes the utterly barren condition of St. Paul's Rocks, as far as vegetation is concerned, not even a single lichen having been found by him. He speaks further of innumerable kinds of seaweed as growing upon the rocks. Mr. McCormick in Ross's 'Antarctic Voyage' speaks of a Conferva of which the sea-birds build their nests. Dr. Hooker in his 'Flora Antarctica' refers to Darwin's admirable account of the island.

I spent about twenty-four hours on the rocks during our two days' stay, and searched carefully for botanical specimens. The seaweeds, instead of being present in innumerable kinds, are, as far as I could ascertain, comparatively few in number, very few species apparently being able to hold their own in the constant heavy surf.

About tide-mark, and, indeed, forming the mark, there is, as at St. Vincent, a band of a dense pinkish white incrustation, consisting of a calcareous Alga, which is bored in all directions by a small tubicolous annelid. This is evidently the reddish band referred to by Mr. McCormick as the work of coral insects. In some places the incrustation is white, with a different surface, and probably consisting of a different species of Alga. Above the line of incrustation the rocks are covered for several feet with a dark red stain, consisting of an Alga, of which specimens were preserved in fluid; and here, where the rock is alternately covered and left bare by the surf, grows a short filamentous Alga which has tufts of a green Conferva adhering to it. The rocky bottom in the small comparatively sheltered bay formed by the circlet of rocks is covered with a dense growth of a green Alga, which extends out a short distance beyond the mouth of the bay

to the depth of 20 fathoms (whence I got up specimens on a fishing-line), and also grows abundantly on the exposed side of the island, as I saw on looking down into the water from the summit of the highest peak. The Alga is constantly loosened by the surf from the bottom, and, floating to the surface, is gathered by the Noddies (*Sterna stolida*) to build their nests; the Boobies (*Sula fusca*) apparently do not use it. A second smaller but similar species grows with this Alga in the bay. I found only one or two other Algæ, and when looking down into the water from above could see only the larger green species covering the bottom. The water deepens so very rapidly around the rock that it is improbable that many species of Algæ grow on it. In fact the marine flora seems to be remarkably poor.

On the aerial surface of the rock I found a green *Chlorococcum* growing in sheltered crevices, on concretionary masses formed of guano mixed with the pupæ of the pupiparous fly *Olfersia*, discovered by Darwin on the island, and spiders' webs. The *Chlorococcum* is the only aerial plant on the island; and it is not abundant. In some pools of stagnant water are some few Diatoms and *Oscillatoriæ*. In some places there are a few bushels of guano to be found in hollows in the rock. I boiled some of this with nitric acid; it was almost wholly soluble, and I could find no diatoms in the small residue. Peruvian guano contains abundance of diatoms. A *Coscinodiscus* has occurred sparingly of late upon the surface of the sea; and it might have been expected to find its way through the small surface-animals into the fish and thus into the guano. Diatoms have as yet, however, never been abundant either at the surface or on the sea-bottom. In the curious veins of conglomerate which traverse the rock in all directions, and are described by Darwin and Mr. McCormick, are fossil fragments of nulliporic incrustation mingled with pebbles and broken shells.

X. Enumeration of the Algæ Collected at St. Paul's Rocks by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.' By Prof. G. Dickie, M.D., F.L.S.

[Read April 16, 1874.]

These detached miniature islands are about one degree north of the equator, and in longitude 29° 15′ W.; they are 540 miles

distant from the nearest point of South America, about midway between that and the African coast. Their dimensions are small, less than a quarter of a mile from end to end of the group; their highest points are from 50 to 60 feet above the sea. The rock is described as a mixture of forms of felspar and silicates of alumina and magnesia, approaching serpentine. There appears to be no trace of land-vegetation, not even a lichen.

The species of Algæ collected by Mr. Moseley (August 27, 1873) are few in number. Every scrap has been carefully examined; and the following list may be regarded as fairly representing the marine vegetation of these isolated rocks.

Sporochnaceæ.

Chnoospora atlantica, *J. Ag.*

A very slender form, the peculiar dilatations below the axils of the segments only here and there apparent.

Geog. distr. The nearest recorded locality is the coast of Venezuela at La Guayra, lat. 10° 31′ N., long. 67° W.

Dictyotaceæ.

Dictyota cuneata, n. sp.?

Radicans, inferne attenuata; segmentis paucis, sursum dilatatis, apicibus obtusis, rotundatis. Fructus?

There was but a solitary specimen, without fruit. I have, however, thought it ought to be specially defined: it may be a young form of some other species; yet it has an aspect of maturity, although little more than an inch in height. In general habit it is nearest to *Dictyota polycarpa*, Sonder.

Ectocarpaceæ.

Ectocarpus breviarticulatus, *J. Ag.*

Very plentiful, growing upon the *Chnoospora*.

On some of the specimens I found the propagula abundant and evidently mature; in form and size I can see no essential difference between them and those of *E. simpliciusculus*, Ag.

Geog. distr. The only record I can find is that in Prof. J. G. Agardh's 'Species Algarum,' in oceanico Pacifico at littus Mexicanum, in *Chnoospora fastigiata* parasitans."

Corallinaceæ.

Lithothamnion polymorphum, *L.*

Abundant, forming a distinct band along the rocks, the *Chnoospora* at a rather higher level *.

Geog. distr. Atlantic and Mediterranean shores; S. Africa; Chonos archipelago.

MELOBESIA LICHENOIDES, *Ellis.*

Sparingly with the *Delesseria* and *Nitophyllum.*

Geog. distr. Shores of Britain and France; various parts of Mediterranean; Norfolk Island; S. Ocean.

SPHÆROCOCCOIDEÆ.

DELESSERIA SPATHULATA, *Sonder?*

Only two or three imperfect specimens, mixed with the *Nitophyllum*; half an inch long by about a line in breadth. I could see no fruit, and can only judge from outline, venation, and general arrangement of the cells that it may be a form of Sonder's plant.

Geog. distr. East coast of Australia.

NITOPHYLLUM ACROSPERMUM, *J. Ag.*

The specimens few and not well preserved; but on some the tetraspores form a solitary circular patch near the apex of the frond, and in other respects agreeing with the general characters of the species.

Geog. distr. Cape of Good Hope.

SQUAMARIEÆ.

HILDENBRANDTIA EXPANSA, n. sp.

Incrustans, vage expansa, ferrugineo-sanguinea; cellulæ superficiales radiatim dispositæ, sphærosporis irregulariter divisis.

The cells of the surface have a distinctly radiate arrangement, are equal in length and breadth, in diameter =·0002 to ·0004 of an inch. The plant is stated by Mr. Moseley to form a dull red band on rocks above the white band of *Lithothamnion.* Its nearest ally seems to be *Hildenbrandtia rosea,* Ktz., which occurs on the Atlantic shores of Europe.

CERAMIACEÆ.

CALLITHAMNION ——?

In small quantity, forming a slender fringe about two lines

* Most of the specimens were drilled throughout by various organisms. A few fragments were sent to Dr. McIntosh of Murthly and Mr. Jeffreys; they report the presence of a sponge, a mollusk allied to *Vermetus, Stoa,* and *Spiroglyphus,* and annelides belonging to the genera *Dodecacria* and *Sabella.*

long upon a few plants of the *Chnoospora*; no fruit, and altogether too imperfect for recognition; it seems, however, nearly allied to *Callithamnion pygmæum*, Ktz., a native of the Mediterranean.

Siphonaceæ.

Caulerpa Webbiana, *Mont.*

Geog. distr. First described by Montagne as a native of the Canary Islands, a specimen from which locality I find to be quite identical with those collected by Mr. Moseley.

C. clavifera, *Ag.*

The leaves, commonly so called, are longer in proportion and more densely imbricated than usual; in these respects the specimens collected by Mr. Moseley are nearly allied to *C. lætevirens*, Mont., from Island of Toud, Southern Ocean, of which I have not seen any authentic specimens.

It appears to be plentiful and of large size, and "is used by *Sterna stolida* to form its nests."

Ulvaceæ.

Prasiola minuta, n. sp.?

Thallo e basi angustata lineari-lanceolato; cellulis subquadratis, in basi 1–3-, sursum 5–6-seriatis.

Very minute species, only detected by use of the microscope; no example quite entire could be seen; diameter of the broadest frond =·0014 of an inch.

In stagnant rock-pools among fine mud.

Oscillariaceæ.

Oscillaria sordida, n. sp.?

Trichomatibus sordide viridibus, ad apicem obtusis, articulis quam diameter (·0004) quadruplo brevioribus, ad genicula paulo contractis.

Sparingly and very fragmentary along with the *Prasiola*.

Palmellaceæ.

Protococcus affinis, n. sp.?

P. sordide viridis, cellulis globosis (diam. = ·0002″–·0004″), in stratum tenue cumulatis.

It seems to be nearly allied to *P. viridis*, Ag.

It forms a dull green coat upon stalactitic masses among guano in sheltered crevices *.

* This is doubtless similar to the matter alluded to by Mr. Darwin "as resembling some of the branched species of *Nullipore*;" it does not effervesce in acids; and Mr. Darwin found it on the Abrolhos Islands among birds' dung.

Diatomaceæ.

Navicula didyma, *Ktz*

Rhabdonema Adriaticum, *Ktz.*

Biddulphia pulchella, *Gray.*

These are the only diatoms observed; they were procured by washing some specimens from the nests of the *Sterna*; guano from the same might have yielded other species.

XI. Notes on Plants Collected at Fernando de Noronha (Sept. 1st and 2nd, 1873). By H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.'

[Read April 16, 1874.]

Fernando de Noronha is situate in lat. 3° 50′ S., distant from the nearest point of S. America (which is about Cape S. Roque) rather more than 200 miles. The island is long and narrow, and stretches about N.E. and S.W. At the eastern extremity is a series of islands known as Platform Island, St. Michael's Mount, Booby Island, Egg Island and Rat Island. The entire length of the whole chain, including the main island, is about seven geographical miles. The main island itself is about 4 miles long, and nowhere more than 2½ broad. At about the middle of its northern coast a remarkable column-like mass of bare rock projects up to the height of 1000 feet. It is known as the Peak. The Peak is composed of phonolite; and the island generally is volcanic, many of the exposed cliffs being seen to be composed of columnar basalt. There are dunes of calcareous sand at the eastern extremity of the island, and some sand-rock like that of Bermuda. The island is hilly, one hill being 600 feet in height. St. Michael's Mount is a conical mass of phonolite 300 feet in height. The other islands are low and flat, and are mainly or entirely composed of sandstone rock like that of Bermuda, but containing volcanic particles.

There is a rainy and a dry season in the island. The rainy season is from January to July, and the dry from July to December. In the dry season there is occasionally want of water; but it often rains during this season, as it did heavily during our stay on September 2.

Apparently the only account of the vegetation of Fernando de Noronha existing is that given by Webster in his narrative of Captain Foster's voyage ('Voyage of the Chanticleer'). Webster mentions a series of plants as occurring, most of which I recognized. Darwin, in his Journal, mentions only two plants —a dark laurel-like tree, and one with pink flowers but without leaves.

All the higher ground of the island, where not cleared for cultivation, with the exception of the perpendicular part of the Peak, is covered with a thick growth of trees, which are indicated on the Admiralty Chart. The trees are none of them large. It is said that all the large ones have been cut down by the convicts for the construction of the small rafts or catamarans, which are much used by them for fishing. The trees are overgrown with dense masses of creepers of various kinds. The plant-growth is thickest and apparently virgin at the western extremity of the island, near the opening through the rock called the Hole in the Wall. The commonest tree is that called by Webster the laurelled Bara; it has dark green laurel-like leaves, and an abundant milky juice; the bark is smooth and brown. I could find no flower or fruit on the tree, but did not search much, since I expected to be able to collect specimens next day; I unfortunately did not even secure a leaf. The tree does not grow on any of the outlying islands; it is evidently the laurel-like tree referred to by Darwin. The next abundant tree or, rather, large shrub, is another Euphorbiaceous plant called by Webster *jatropha* or *pinhao*, *Jatropha gossypifolia*, Linn. It has a pink flower, and had only single tufts of young leaves immediately beneath the inflorescences at the time of our visit, although it was in full flower; its bare stems and branches render it a striking object amongst the green of the creepers when the forest is viewed from the sea. Webster says that it casts its leaves in July and August (that is, at the commencement of the dry season). It is evidently the tree mentioned by Darwin as occurring on the Peak. The tree grows on St. Michael's Mount and Rat Island. I saw several specimens of a tree with rounded leaves of a bluish green and stout thorns; it had a Euphorbiaceous look; I looked for flower and fruit without success. The tree occurs only on the main island. One of the trees was about 20 feet high and 9 inches in diameter of trunk. Some thorny Acacia bushes are abundant on the shore. *Abrus precatorius* twines round every thing on the main island; but I did not see it on the

outliers; *Jatropha urens* is abundant everywhere, and a horrible pest.

An *Ipomœa* (*I. pes-capræ*), apparently the same as at Bermuda and the Cape-Verdes, is in abundance on the sand-hills, and is covered with a *Cuscuta* (*C. americana*), which is extremely abundant and attacks most of the low herbs.

I saw only one grass (*Oplismus colonus*) on the main island; but that was abundant. A *Cereus* covers the cliffs; but I did not see *Cactus quadrangularis*, mentioned by Webster. The Cape gooseberry and Castor-oil plant grow wild on all the islands. Some few of the plants which I collected on the main island were gathered in the neighbourhood of the convict settlement, and are therefore probably introduced species.

The upper part of St. Michael's Mount is covered with a thick growth of bushes, trees, and creepers; the island is comparatively inaccessible, and affords no space for cultivation; all the plants upon it have therefore probably reached it by natural agencies. I was several hours on the rock, and believe that I made a tolerably complete collection of its flora. At the base of the rock grows an *Ipomœa* with a large white flower. I did not see this species on the main island, but only the blue-flowered one (*I. pes-capræ*), which does not grow on St. Michael's Mount or any of the other outliers on which we landed, although this white-flowered species is abundant on all of them. A fig grows all over the upper part of the rock, and in favourable spots forms a considerable tree; I saw one about 18 inches in diameter of trunk, and 30 feet in height; the tree is wide and spreading, and throws down aerial roots like *Ficus indica*. Webster mentions the Banyan as growing at Fernando de Noronha; this is evidently the tree referred to. It grows also on Rat Island, near the sea-level, but does not there form a tree, but merely a sort of low scrub. Another tree, *Capparis cyanophallophora*, Linn., with dark green leaves of an oval lanceolate form, grows abundantly on the summit of St. Michael's Mount; it has curious green masses upon it, about which I am uncertain whether they are an inflorescence or a morbid growth; the tree has a stem about 8 or 9 inches in diameter, and an almost creeping habit. On Rat Island there is a thick growth of a grass with clinging seeds mingled with Leguminous and Euphorbiaceous herbs and Cucurbitaceous creepers; there is no tree, there not being sufficient shelter from the wind; the Fig does not reach more than 5 or 6 feet in height.

An *Halophila* was dredged in shallow water, but unfortunately without flower or fruit.

On the whole I should expect from what I saw during my few hours on the islands, that the flora of Fernando de Noronha is not very rich in species; the same plants recur everywhere. I collected only about fifty species of flowering plants in all.

I could find no Fern, either on the mainland or on St. Michael's Mount, although there are moist and shady spots about the latter rock where Ferns might have grown. I saw also no Moss or Liverwort on the islands. Lichens are very scarce. I noticed only two incrusting species; and these were not abundant. There is a small inland lake marked on the chart at the western extremity of the main island. Ferns, Sedges, &c. may possibly grow there; but perhaps the occasional drought is too much for them.

The top of the Peak appears to be without vegetation; it is utterly inaccessible. Marine Algæ, excepting incrusting calcareous forms, are not at all abundant about tide-mark; but about twenty-four species were obtained by Prof. Thomson whilst dredging in shallow water of from 7 to 20 fathoms, and with these the *Halophila*. A green *Ulva* grows on some low rocks on the sandy northern beach.

Sugar-cane, Maize, Cassava, a black Bean, and Sweet Potatoes are cultivated in Fernando de Noronha, the beans and maize in the greatest quantities, Bananas and Melons are the principal fruit; the latter are especially fine and abundant. Grapes are not now cultivated, though they are said to do well.

XII. Enumeration of Algæ from Fernando de Noronha, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.' By G. Dickie, M.D., F.L.S.

[Read April 16, 1874.]

The Algæ from Fernando de Noronha were dredged at depths of from 7 to 20 fathoms; a very few from rock-pools.

Fucaceæ.

Sargassum vulgare, *Ag.*
Geogr. distr. Tropical and subtropical Atlantic; Manilla; Mauritius.

The specimens much smaller than usual.

Dictyotaceæ.

Haliseris plagiogramma, *Mont.*
Geogr. distr. Brazil; Sandwich Islands.

H. delicatula, *Lamx.*
Geogr. distr. Florida; W. Indies; Brazil.

Padina pavonia, *L.*
Geogr. distr. Widely diffused in both hemispheres.

Dictyota ciliata, *J. Ag.*
Geogr. distr. Florida; W. Indies.

D. Bartynesiana, *Lamx.*
Geogr. distr. Florida; W. Indies.

Asperococcus intricatus, *J. Ag.*
Geogr. distr. Gulf of Mexico.

Rhodomelaceæ.

Amansia Duperreyi, *Ag.*
Geogr. distr. Martinique.

Acanthophora Thierrii, *Lamx.*
Geogr. distr. Biarritz; Florida; W. Indies; Brazil.

Corallinaceæ.

Corallina ceratoides, *Ktz.*
Geogr. distr. Shores of Mexico.

Jania cubensis, *Mont.*
Geogr. distr. Gulf of Mexico.

Lithothamnion mamillare, *Haw.*
Geogr. distr. Bahia; Cape Verde; Algoa Bay.

Sphærococcoideæ.

Gracilaria multipartita, *Clem.*
Geogr. distr. England; Spain; France; U. States; Indian Ocean.

Mr. Moseley's specimens comprehend the ordinary form of the species, as also var. *β. angustissima*, and forms intermediate between the two.

G. armata, *Ag.*?
Geogr. distr. Mediterranean; Florida.

Only two or three very imperfect specimens, and therefore the species doubtful, but having the structure of the genus.

Squamarieæ.

Peyssounelia Dubyi, *Crouan.*
Geogr. distr. France; Britain; Florida.

A few very dwarf specimens upon *Lithothamnion mamillare*.

Helminthocladieæ.

Galaxaura cylindrica, *Lamx.*
Geogr. distr. Barbadoes; Red Sea.

G. oblongata, *Lamx.*
Geogr. distr. W. Indies.

G. marginata, *Lamx.*
Geogr. distr. W. Indies; Madagascar; Mauritius.

G. rugosa, *Lamx.*
Geogr. distr. W. Indies; Mauritius; Gambier Islands.

Cryptonemiaceæ.

Chrysymenia enteromorpha, *Harv.*?
Geogr. distr. Florida.

The single very fragmentary specimen has the structure of the genus; but the species is doubtful.

Siphonaceæ.

Caulerpa clavifera, *Ag.*
Geogr. distr. Canaries; Red Sea; Indian Ocean.

C. mexicana, *Sonder.*
Geogr. distr. Gulf of Mexico.

Halimeda opuntia, *Lamx.*
Geogr. distr. Florida; W. Indies; Mauritius; Philippines.

ULVACEÆ.

ENTEROMORPHA ——?

So very imperfect that the genus only can be indicated; it seems nearly allied to *E. clathrata*, Grev.

KALLONEMA OBSCURUM, n, sp. Frons capillaris, undulata, pallide virescens, vage et irregulariter ramosa, e cellulis subquadratis laxe connexis formata.

The specimens are very fragmentary, mixed with some of the following in rock-pools.

ULVA LOBATA, *Ktz.*

Geogr. distr. Chili; Cape G. Hope; Mauritius; Ceylon; Macao; Singapore.

CONFERVACEÆ.

CLADOPHORA SUBVARICOSA, n. sp. Filamentis passim varicosis sparsissime ramosis, articulis diametro 3–8plo longioribus.

In rock-pools, with *K. obscurum.*

C. MINUTA, n. sp. Ramulis brevibus, alterne distributis, articulis omnibus diametro 10plo longioribus.

A very small species, 1 to 2 lines long; diameter =·001 inch. Rock-pools, Platform Island; with the next.

OSCILLARIACEÆ.

LYNGBYA NORONHÆ, n. sp. Vaginis valde mucosis, subhirtis, confluentibus, trichomatibus curvulis, luteolis, articulis diametro 2–3plo brevioribus.

Forming yellowish shrub-like masses, half an inch to an inch high; entire diameter of filaments =·0006 inch; in rock-pools, Platform Island. It seems nearly allied to *L. fulva*, Haw.

PALMELLACEÆ.

HORMOSPORA PELLUCIDA, n. sp. Tubulis simplicibus, mucosis, pellucidis, æqualibus; cellulis ellipticis, diametro 2plo longioribus, in seriem moniliformem transverse dispositis.

A very delicate species; entire diameter of the filaments = ·006 inch. In rock-pools, mixed with *Cladophora* &c. above described.

Excluding three or four, mostly cosmopolites, and the smaller species from rock-pools, the Algæ of Fernando de Noronha are related chiefly to those of the Mexican Gulf.

———

XIII. Enumeration of the Lichens collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger,' in the Islands of the Atlantic Ocean. By Dr. J. Stirton.

[Read June 4, 1874.]

Cape Verde.

Gonionema velutinum (*Nyl.*).
Ad saxa, Bird Island.

Endocarpiscum aterrimum, sp. nov.
Thallus ater, e squamis crassiusculis segregatis vel fere conjunctis compositus; apothecia endocarpea albida; thecæ fusiformes myriosporæ, sporæ ellipsoideæ, incolores, circa ·0035 × ·002 millim.; paraphyses graciles et sat confertæ; gelatina hymenialis iodo cærulescens dein vinose rubescens; pars media thecarum flavens, apicibus persistenter cærulescentibus.
Ad saxa.

The thallus is composed of gelatinous globules containing several cærulescent gonimia.

Pyrenopsis pelia, sp. nov.
Thallus nigricans, tenuis, granuloso-furfuraceus, crustam formans furfuraceam; apothecia concoloria lecanorina, minuta, concava, margine thallino prominulo cincta, intus purpurascens præsertim hypothecium; sporæ 8næ, incolores, ellipsoideæ, 1-septatæ vel spurie 1-septatæ, ·0085–·009 × ·005–·006 millim.; paraphyses parcæ graciles. Gelatina hymenialis iodo flavescens, ea intra thecas, sporas et gonimia vinose rubens.
Ad saxa, supra thallum *Lecanoræ pyraceæ* (Ach.).

Roccella tinctoria, *DC.*

When the epidermic layer of the cortex is complete, the reaction is K— C—; but when this is removed, K gives a yellow, and C an evanescent red, also C (soredia) red evanescent.

Roccella patellata, sp. nov.
Thallus (K – C –) teres (latit. circa 1 millim.) rigidus parce ramosus, pollicaris (raro ultra), pallidus vel frequentius glauco-fuscescens sorediosa; apothecia nigra lecideina, sessilia, terminalia vel subterminalia, albo-pruinosa, plana, majuscula (latit. usque interdum 3 millim.), margine acuto undulato cincta; sporæ 8næ, incolores, fusiformes 3–7-septatæ, ·022–·032 × ·004 millim. Gelatina hymenialis iodo vinose rubens.
Ad saxa. Bird Island.

I cannot without further evidence identify this with *R. intricata* (Mont.) or *R. Gayana* (Mont.).

Although there is no visible reaction with either K or C on the external amorphous layer of the cortex, when this is removed K gives a yellow reaction and C an evanescent red. C applied to the soredia gives the same reaction.

ALECTORIA SULCATA (*Lév.*), thallo omnino sulcato-fisso.

Supra terram.

K imparts a yellow colour to the thallus as well as medulla, merging at times into a ferruginous red.

ALECTORIA EPICHRYSA, sp. nov.

Thallus (K purpurascens) sulphureo-virens vel aurantiacus, gracilis erectus, alt. 3- vel 4-pollicaris, divaricato-ramosus, ramulis apicalibus brevibus deflexis, sorediis minutis albidis inspersus et pulvere ochraceo crebre suffusus sed non sulcato-fissus; apothecia et spermogonia ignota.

Supra terram.

Forte forma *A. virentis* (Tayl.).

The cortical layer is thin; the medullary white, and composed of branching fibres ·004 millim. in diameter, pretty closely arranged, but still free, not agglutinated.

RAMALINA SCOPULORUM, var. TENUIOR (*Strtn.*).

Thallus (K flavens dein rufo-ferrugineus) teres, fere filiformis, intricate cæspitosus et divaricato-ramosus, alt. vix pollicaris.

Supra terram.

RAMALINA POLYMORPHA (*Ach.*).

Supra saxa maritima.

Various forms, as var. *ligulata* and other intermediate varieties.

RAMALINA FARINACEA (*Fr.*).

Supra terram.

PARMELIA TILIACEA, var. SCORTEA (*Ach.*).

Ad saxa.

PARMELIA LÆVIGATA (*Ach.*).

Ad saxa.

PARMELIA CONSPERSA (*Ach.*).

Ad saxa.

PLACODIUM ELEGANS (*Link*).

Ad saxa.

Placodium flavo-rubens (*Nyl.*).
Ad saxa.

Lecanora pyracea (*Ach.*).
Ad saxa.

Lecanora subfusca, var. **atrynea** (*Ach.*).
Ad saxa.

Pertusaria leioplaca (*Ach.*).
Ad saxa.

Lecidea thyrsodes, sp. nov.

Thallus (K – C –) cinereus vel cinereo-fuscescens rugulosus rimuloso-areolatus, sat tenuis; apothecia nigra mediocria, sessilia vel elevato-sessilia, primum coarctata, demum plana obtuse marginata, intus pallida; sporæ 8næ incolores, 6–8- pluriseptatæ fere cylindraceæ, ·07–·09 × ·0035–·004 millim.; paraphyses satis confertæ, graciles, filiformes, apicibus ramosis et articulatis leviter fuscescentibus; hypothecium incolor. Gelatina hymenialis iodo non tincta, sed hypothecium violacee tinctum.

Ad saxa. Bird Island.

Lecidea teichiodes, sp. nov.

Thallus murinus vel fusco-cinerascens, crassus (1·5 millim.), tessellato-areolatus (quaque areola spermogonia multa innata depressa fovente); apothecia parva, innata, plana vel nonnihil concava, fusca, albido-pruinosa, leviter marginata, intus cinerascentia; sporæ 8næ, elongato-ellipsoideæ, incolores, 3?-septatæ, interdum curvulæ, ·024–·03 × ·003–·0045 millim.; paraphyses crassæ (circa ·002 millim.), graciles, irregulares, interdum ramosæ et articulatæ; hypothecium fusco-nigrum. Gonidia flaventia, majuscula. Gelatina hymenialis iodo vinose rubescens vel fulvescens.

Thallus C erythrinosus, reactione lente evanescente.

Spermogonia fuscescentia: spermatia curvata, longit. ·012–·015, crassit. haud ·001 millim.: sterigmata simplicia gracilia.

Ad saxa.

Lecidea myriocarpa, *DC.*
Ad saxa.

Lecidea epipasta, sp. nov.

Parasitica supra thallum *Lecanoræ flavo-rubentis*; apothecia nigra parva plana et leviter marginata, demum convexa et immarginata rugulosa; sporæ 8næ, incolores, 1–3-septatæ cylindraceæ vel elongato-ellipsoideæ, sæpe curvatæ et nucleatæ, ·018–·028 × ·004–·0055 millim.; paraphyses satis distinctæ, apicibus incrassatis conglutinatis nigro-purpurascenti-

bus et granulis inspersis; hypothecium incolor. Gelatina hymenialis iodo cærulescens, præsertim ea circa apices thecarum, dein vinose rubens.

Ad saxa.

Opegrapha undulata, sp. nov.

Thallus (K – C –) crassus pallidus vel pallide flavidus, rimoso-areolatus, subfarinaceus; apothecia nigra pulvere albido suffusa, radiato-ramosa, subinnata, explanata, apicibus rotundata, margine proprio tumidulo undulato cincta; perithecium laterale; sporæ 8næ incolores fusiformi-ellipsoideæ, 7–9- (plerumque 8-)septatæ, ·028–·035 × ·0045–·0055 millim., halone cinctæ; paraphyses satis distinctæ irregulares, interdum ramosæ; hypothecium pallide rufescens. Gelatina hymenialis iodo vinose rubescens, ea circa thecas intensius tincta.

Ad saxa.

Contiguous to the preceding is the barren thallus of another, and having much its external aspect, with, however, a different chemical reaction.

Lecidea —— ?

Thallus pallidus vel pallide cervinus, crassiusculus, rimoso-areolatus, non nihil rugulosus, C primum erythrinosus, dein persistenter rufulo tinctus.

The barren thallus of another lichen, belonging in all likelihood to the genus *Lecidea*, covers several pieces of stone.

Lecidea ?

Thallus cervinus vel pallide rufescens, crassiusculus, glebuloso-congestus, glebulis spermogonia multa depressa livida foventibus; spermatia recta acicularia, circa ·01 × ·0005 millim., sterigmatibus simplicibus.

Ad saxa. Bird Island.

Bermuda.

Leptogium tremelloides (*Fr.*), var. mesotomum (*Strtn.*).

Thallus pallide plumbeo-glaucescens, subfarinaceus, varie dissectus, lobis crispatis reflexis, subtus pallidus.

Ad cortices.

This lichen approaches *L. diaphanum* (Mnt.) in various aspects, and *L. callithamnion* (Tayl.) in the paler under surface; but the large-celled cortical layer &c. warrant a nearer affinity to *L. tremelloides*.

Leptogium marginellum (*Ach.*).

Ad cortices.

CLADONIA TURGIDA (*Hffm.*).
Var. CONSPICUA (*Del.*),
Var. ELEGANS (*Del.*),

As well as one or two others, which can scarcely be characterized.

Supra terram.

CLADONIA BOTRYTES (*Hffm.*).
Supra terram.

In this and in one of the forms of the preceding, the thallus is congested beneath into a continuous firm white crust, from which the squamæ arise, more closely disposed than in Scandinavian specimens; there is, however, little or nothing in other respects to warrant a separation.

RAMULINA BERMUDIANA, sp. nov.
Thallus (K e flavo rufo-ferrugineus) pallidus aut stramineo-pallidus aut stramineo-rufescens, subnitidus, depresso-cæspitosus sat late expansus rigescens, totus e laciniis linearibus dichotome multifidis compositus, tuberculis parvis concoloribus inæqualis, marginibus tuberculosis et nonnihil reflexis; apothecia cervina vel pallide rufescentia, marginalia subpedicellata concava majuscula marginibus integris; sporæ 8næ oblongo-ellipsoideæ, sæpe curvulæ, 1-septatæ, ·01–·016×·005 millim. Gelatina hymenialis iodo cærulescens, dein vinose rufescens.
Ad ramulos arborum.

The differences indicated above warrant a separation from any of the states of *R. scopulorum* (Ach.) that have come under my notice. Apart from the colour, it bears a considerable resemblance to *Physcia chrysophthalma.*

PARMELIA TILIACEA, var. SCORTEA (*Ach.*).
Ad truncos putridos.

PARMELIA PHYSODES, var. LABROSA (*Ach.*).
Ad ligna vetusta.

PHYSCIA SPECIOSA (*Fr.*).
Ad corticem.

PHYSCIA STELLARIS (*Fr.*).
Ad corticem.

LECANORA VARIA, var. SYMMICTA (*Ach.*).
Ad corticem.

LECANORA SUBFUSCA, var. ARGENTATA (*Ach.*).
Ad corticem.

LECANORA ANGULOSA (*Ach.*)., var. ALBO-PRUINOSA (*St.*).
Thallus albus (K flavens, C –); apothecia pallida, albo-pruinosa margine firmo prominulo flexuoso.
Ad corticem.

PERTUSARIA LEIOPLACA (*Ach.*).
Ad corticem.

PERTUSARIA MELALEUCA (*Sm.*).
Ad corticem.

The specimens are not matured; and the ostiola scarcely show black.

LECIDEA CALIGINOSA, sp. nov.
Thallus (K – C –) cinereus vel fusco-cinereus, adpresso-squamulosus, tenuis; apothecia elevato-sessilia fusco-nigra, primo plana leviter et obtuse marginata, dein convexa et rugosa; sporæ 8næ, simplices, incolores, ellipsoideæ vel fusiformi-ellipsoideæ, ·01–·012 × ·006 millim.; paraphyses haud discretæ vel fere conglutinatæ, apicibus incoloribus; hypothecium crassum, fusco-nigrum. Gelatina hymenialis iodo dilute cærulescens, dein vinose fulvescens sed in cærulescentiam cito revertens.
Ad cortices.
Forte nimium arcte affinis *L. mæstulæ* (Nyl.).

LECIDEA EUPORIZA, sp. nov.
Thallus pallidus vel pallide cinereus, tenuis; apothecia parva, flavida, demum fusca pellucida plana, margine obscuriore, sessilia vel elevato-sessilia, intus nonnihil purpurascentia, cæteroquin incoloria; sporæ 8næ, incolores, simplices, cylindraceæ, ·02–·032 × ·0035 millim., rectæ vel interdum curvulæ; paraphyses conglutinatæ et indistinctæ. Gelatina hymenialis iodo cærulescens, dein fulvescens.
Ad corticem.

The thallus is nearly concealed by an imperfectly developed and barren collema.

LECIDEA SEMIUSTA, sp. nov.
Thallus niger, rimoso-diffractus, squamulosus, squamulis marginibus recurvis; apothecia nigra, sessilia, plana, marginata; sporæ 8næ, incolores, elongato-ellipsoideæ rectæ vel curvulæ, normaliter 3-septatæ, interdum 1-septatæ vel simplices, ·008–·01 × ·003 millim.; paraphyses indistinctæ, apicibus incoloribus; hypothecium leviter fuscescens. Gelatina hymenialis iodo dilute cærulescens, dein obscure violacee tincta.
Ad saxa.

Only one apothecium was detected; and so far the diagnosis is defective.

LECIDEA REVERTENS, sp. nov.

Thallus (K—C—) albidus, continuus, tenuis, subfarinaceus; apothecia subinnata, minuta, fusco-nigra, humida fusca pellucida, margine obscuriore fere nigro, intus incoloria; sporæ 8næ, incolores, simplices, fere cylindraceæ, ·007 × ·0025 millim. non rite evolutæ; hypothecium incolor. Gelatina hymenialis iodo leviter cærulescens, dein obscure violacea.

Ad saxa.

GRAPHIS AFZELII (*Ach.*).

Ad cortices.

GRAPHIS PUNCTIFORMIS (*Eschw.*).

Ad cortices.

GRAPHIS NEMATODES, sp. nov.

Thallus albidus vel pallide cinereus, tenuissimus, dilatatus; apothecia nigra, innata, elongata, flexuosa, fere simplicia, apicibus obtusis, epithecio rimiformi; sporæ 8næ, incolores, oblongo-ellipsoideæ (utrovis apice acutiusculo), 10–12-loculares, ·06–·085 × ·01–·014 millim.; paraphyses non bene discretæ et granuloso-inspersæ; hypothecium fere incolor. Gelatina hymenialis iodo haud tincta; sporæ violacee tinctæ.

Ad corticem.

The spores are colourless, but when old and shrivelled have a brownish appearance. Allied to *G. comma* and *G. assimilis.*

ARTHONIA INTERVENIENS (*Nyl.*) *Nov. Gran.* i. p. 68.

Ad corticem.

ARTHONIA VELATA, sp. nov.

Thallus (an proprius?) albidus vel pallidus, crassiusculus, farinaceus, fere spongiosus rimoso-diffractus; apothecia nigra, innata, minutissima (latit. circa ·05 millim.), sparsa vel seriatim disposita; sporæ 8næ (in thecis saccatis), primum incolores, demum fuscæ vel potius obscure violaceæ, obovatæ (uno alterove apice attenuatæ), 3–4-septatæ, ·02–·03 × ·01–·014 millim.; paraphyses nullæ distinctæ. Gelatina hymenialis iodo dilute cærulescens.

Ad cortices.

As the thallus is abundantly supplied with gonidia as well as crystals of oxalate of lime, a presumption is afforded that the *Arthonia* is parasitic. I possess a similar instance from the Bony river, Western Africa.

TRYPETHELIUM CRUENTUM (*Mnt.*).

Ad cortices.

Azores, Furnas.

CLADONIA PYXIDATA, var.
Ad saxa.

CLADONIA SQUAMOSA (*Hffm.*)?
Supra terram.

Barren.

ROCCELLA PHYCOPSIS (*Mnt.*).

The reactions of this lichen, as stated by Leighton in his 'Lichen Flora,' are at variance with those observed in the present instance; accordingly I think it right to state them here.

Thallus K yellow; medulla K— C—, soredia C red evanescent. Medulla assumes a deep blue with iodine; and under the microscope the fibres of which it is composed assume, by the same reagent, a violet tint, merging ultimately into fulvescent. The structure of a section of the thallus agrees with that figured by Nylander in his Synopsis.

Ad saxa.

STICTA DAMÆCORNIS (*Ach.*); etiamque

STICTA DAMÆCORNIS, var. CANARIENSIS (*Del.*).
Ad truncos arborum.

PARMELIA PERLATA (*L.*).
Ad truncos arborum.

PARMELIA CAPERATA (*L.*).
Ad truncos arborum.

PARMELIA PERFORATA (*Wulf*).
Ad ligna vetusta.

LECIDEA CYANOCHROA, sp. nov.

Thallus pallide cinerascens, tenuis; apothecia nigra, sessilia, mediocria, plana, marginata, demum nonnihil convexa, intus purpurascentia; sporæ 6–8næ, incolores, rectæ, bacillares, 6–12 (et ultra)-septatæ, septis indistinctis, ·06–·08 × ·004–·0045 millim.; paraphyses graciles apicibus clavatis purpurascentibus; hypothecium fere incolor; stratum infra hypothecium purpurascens. Gelatina hymenialis iodo leviter cærulescens, dein vinose rubens.

Ad corticem.

Teneriffe.

RAMALINA AULOTA, sp. nov.

Thallus ochroleuco-pallidus, compressiusculus, lævis, sparsim lacunose impressus, parce ramosus, erectus, brevis, subinanis; apothecia terminalia vel subterminalia, plana, majuscula, receptaculo subpedicellato, margine integro; sporæ 8næ, ellipsoideæ, 8-septatæ, rectæ, ·009–·012 × ·0055–·0065 millim.; paraphyses non bene distinctæ. Gelatina hymenialis iodo cærulescens. Spermogonia nigra, majuscula, innata.

Supra saxa.

This lichen comes near *R. inanis* (Mnt.), inasmuch as the medullary part of the stem is nearly empty, being traversed only by a few scattered branching fibres; but the spores are much smaller and of a different shape, &c.

STICTA AURATA (*Ach.*).

A form approaching var. *pallens* (Nyl.).

Ad truncos arborum.

PARMELIA OLIVACEA, var. STYGIA (*Ach.*).

Supra rupes.

SQUAMARIA SAXICOLA (*Poll.*).

Ad saxa.

SQUAMARIA MELANOPHTHALMA (*Ram.*).

Ad saxa.

PLACODIUM MURORUM, var. MINIATUM (*Hffm.*).

Ad saxa.

LECANORA PALLESCENS (*Ach.*).

Ad saxa.

LECANORA NOSERIZA sp. nov.

Thallus (K− C−) albus, e glebulis sparsis compositus; apothecia primum coarctata, demum expansa, concava, pallida, margine prominulo irregulari cincta; sporæ 8næ, simplices, incolores, ellipsoideæ, ·012–·014 × ·0085–·009 millim.; paraphyses non bene discretæ, irregulares apicibus pallide fuscescentibus conglutinatis. Gelatina hymenialis iodo intense cærulescens.

Ad corticem.

Forte nonnisi varietas *L. variæ*.

URCEOLARIA SCRUPOSA (*L.*).

Supra terram.

LECIDEA GEOGRAPHICA (*L.*).

Ad saxa.

LECIDEA ATROBRUNNEA (*DC.*)
Ad saxa.

This lichen is barren; but its thallus resembles in many respects that of the species under which it is placed.

Fernando de Noronha.

LECANORA RECUBANS, sp. nov.
Thallus (K fl., C fl.) albidus vel pallide cervinus crassiusculus rimoso-areolatus rugulosus *albo* determinatus; apothecia minuta innata concoloria concava marginata; sporæ 8næ simplices incolores ellipsoideæ ·009–·012 × ·006–·007 millim., non rite evolutæ; paraphyses non bene distinctæ, apicibus citrinis granuloso-inspersis; hypothecium incolor. Gelatina hymenialis iodo dilute cærulescens, dein pallide fulvescens.
Ad saxa.

The spermogonia have not been determined. On one occasion spermatia, or what might have been considered such, were detected in the field of the microscope, oval in outline, and about ·015 × ·001 millim.

XIV. Enumeration of Algæ from 30 fathoms, at Barra Grande, near Pernambuco, Brazil, collected by H. N. MOSELEY, M.A., Naturalist to H.M.S. 'Challenger' (Sept. 10th, 1873). By G. DICKIE, M.D., F.L.S.

[Read April 16, 1874.]

FUCACEÆ.

SARGASSUM VULGARE, *Ag.*

Specimens large, abundant, and in every respect the same as it occurs in shallower water.

Geogr. distr. Tropical and subtropical Atlantic; Spain; Portugal; Manilla; Mauritius.

DICTYOTACEÆ.

HALISERIS PLAGIOGRAMMA, *Mont.*
Geogr. distr. Brazil; Sandwich Islands.

ZONARIA LOBATA, *Ag.*
Geogr. distr. Florida; Canaries; Brazil; Cape G. Hope.

Z. VARIEGATA, *Lamx.*
Geogr. distr. Canaries; W. Indies; Brazil.

DICTYOTA DICHOTOMA, *Hudson*.

Also var. *implexa*.

Geogr. distr. Various forms in both hemispheres.

D. DENTATA, *Lamx*.

Geogr. distr. W. Indies; Brazil.

SPHÆROCOCCOIDEÆ.

GRACILARIA CONFERVOIDES, *L*.

A single specimen, very dwarf.

Geogr. distr. Widely diffused in both hemispheres.

SIPHONACEÆ.

CAULERPA CLAVIFERA, *Ag*.

Geogr. distr. Canaries; Red Sea; Indian Ocean.

C. PROLIFERA, *Lamx*.

A solitary example, very small; probably immature

Geogr. distr. Florida; W. Indies; Gambier Islands.

UDOTEA CONGLUTINATA, *Lamx*.

More delicate in texture than usual, and with little or no calcareous deposit.

Geogr. distr. Florida; W. Indies.

CODIUM TOMENTOSUM, *Stack*.

Geogr. distr. Widely distributed in both hemispheres.

HALIMEDA OPUNTIA, *Lamx*.

Geogr. distr. Florida; Philippines; and various parts of Indian Ocean; Mauritius.

H. TUNA, *Lamx*.

Geogr. distr. Florida; Mediterranean.

VALONIACEÆ.

CHAMÆDORIS ANNULATA, *Mont*.

Geogr. distr. Florida; W. Indies.

CONFERVACEÆ.

MICRODICTYON CALODICTYON, *Mont*.

One specimen only and very imperfect; but seems to accord with usual characters.

Geogr. distr. Canaries.

CHÆTOMORPHA ÆREA, *Dillw*.

Geogr. distr. Atlantic coasts of Europe; U. States; Mediterranean; Canaries.

XV. Enumeration of Algæ from Bahia, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger' (Sept. 25th, 1873). By G. Dickie, M.D., F.L.S.

[Read April 16, 1874.]

Rhodomelaceæ.

Chondriopsis atropurpurea, *Harv.*?
Geogr. distr. U. States.

Mr. Moseley's specimens are referred to the above species with considerable doubt; there is no fructification of any kind; the structure corresponds with that of *Chondriopsis*.

Bryothamnion Seaforthii, *Turn.*
Geogr. distr. W. Indies.

Dasya Tumanowiczi, *Harv.*
Geogr. distr. Florida; Bermuda.

Sphærococcoideæ.

Gracilaria multipartita, *Clem.*
Geogr. distr. S. W. shores of Europe; U. States; E. India.

Cryptonemiaceæ.

Cryptonemia crenulata, *J. Ag.*
Geogr. distr. Brazil.

Halymenia Floresia, *Clem.*
Geogr. distr. Mediterranean; Red Sea; Florida.

Siphonaceæ.

Udotea Halimeda, *Ktz.*
Geogr. distr. Bahama; St. Thomas; W. Indies.

XVI. Notes on Plants collected in the Islands of the Tristan d'Acunha group. By H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger'.

[Read May 7, 1874.]

Tristan d'Acunha.—The only accounts of the flora of Tristan d'Acunha extant are, according to Bentham (Journal of Linn. Soc. Botany, vol. xiii. 1873, p. 564), Dupetit Thouars's flora of

the island, in his 'Mélanges,' and Captain Carmichael's paper in the Linn. Trans. vol. xii. p. 496. A summary of Captain Carmichael's account is given by Grisebach 'Veg. der Erde,' vol. ii., where the Island of Tristan is by some mistake described as being two geographical square miles in area. The actual area is about 16 square miles.

H.M.S. 'Challenger' anchored, as is usual, on the north side of the island. The island here rises in a range of perpendicular cliff of black volcanic rock, with a structure not unlike that exposed in section in the Grande Cural, in Madeira, in appearance. At the foot of the cliff, directly opposite the anchorage, are débris slopes and irregular rocky and sandy ground, forming a narrow strip of low shore-land. The settlement lies on a broader and more even stretch of low land, which extends westwards. Above it the cliffs are broken by deep gullies, up which the ascent to the plateau above is easy.

Owing to the very short time (six hours) during which it was possible to remain on the island, the collection of plants was restricted to the irregular strip of shore-land opposite the anchorage, and to the gully immediately above the settlement, which had been explored to a height of about 400 feet at the time the recall was hoisted on board the ship, owing to a sudden squall accompanied by hail.

The cliffs have a scanty covering of green—derived mainly from grasses, sedges, mosses and ferns, with darker patches of *Phylica arborea* and *Empetrum* (*E. nigrum*, var. *rubrum*, = *E. medium*, Carm.)—which became more and more marked towards the summit. Conspicuous patches of bright green are formed under the cliff at the foot of the water-courses by a *Rumex* (*R. frutescens*, Th.). Dotted about amongst the other herbage are rounded tufts of pale bluish green, consisting of *Spartina arundinacea.* On near inspection, the damp foot of the cliffs is found to be covered with Mosses and Liverworts, which latter form in favourable situations continuous green sheets covering the earth beneath the grass.

Unfortunately specimens in fructification were rare. An *Asplenium* (*A. obtusatum*, Forst.), growing in the clefts of the rocks like *A. marinum*, and *Lomaria alpina* are most abundant under the cliffs. The *Lomaria* plants, where situated on stony slopes and comparatively starved, were all provided with fertile fronds, whilst when growing in the rich vegetable mould they

were commonly without fructification. The commonest flowering plants under the cliffs are *Apium graveolens* (*A. australe*, Th.), *Empetrum*, *Sonchus oleraceus*, another Composite (*Hypochæris glabra*), and a plant resembling in appearance a Chrysanthemum (*Chenopodium tomentosum*, Th.), with strongly scented leaves, and which is used as tea by the inhabitants, a decoction of the leaves being drunk with milk and sugar. The plant grows abundantly on Inaccessible Island; but only the remains of last season's inflorescence were to be found. The plant is called "tea" by the inhabitants of Tristan. *Nertera depressa* is very abundant, creeping everywhere amongst the moss. A yellow-flowered *Oxalis* (*O. corniculata*) was not abundant. *Cardamine hirsuta* was, singularly enough, not met with on either of the three islands of the group, though said by Carmichael to be abundant on the seashore. Some shallow freshwater ponds close to the sea-beach were covered with *Confervæ*, but contained no *Chara*. Around these ponds grew a minute Sedge (*Isolepis*, sp.) not found on the other two islands of the group.

In the gully above the settlement *Phylica-arborea* shrubs commence at about 400 feet elevation. There are no trees in this locality, since they have been cut down for firewood; but there is still plenty of wood on the island; and the trunks of the trees on the upper plateau reach a diameter of 1¼ feet, as I was told by the inhabitants: the wood-supply is not almost exhausted as is stated in the 'Cruise of the Galatea.' A *Trichomanes* (? *Hymenophyllum æruginosum*) was found in this gully, and a large specimen of *Lomaria Boryana* was picked up, detached, apparently fallen from above. A *Hymenophyllum* was found by the surgeon of the 'Challenger,' which I did not obtain. In a deep ditch near one of the cottages are two or three Willow bushes, which in this sheltered situation are doing well. The water of the streams running down the cliffs opposite the anchorage was found to have a temperature of 50° F., and one of the freshwater ponds at sea-level a temperature of 54° F. The greater cold of the stream is obviously due to the influence of the snow-water from the Peak above.

The surf throws up a bank of seaweed on the beach; but the heavy waves, dashing on the coarse boulders of which the beach is composed, pound up the Algæ to such an extent that a useful specimen is scarcely to be found. The island has a belt of *Macrocystis pyrifera* growing round it. The part between the anchorage and the shore was in about 15 fathoms.

Inaccessible Island.—Inaccessible Island is distant from Tristan d'Acunha twenty-three miles, *i. e.* from the centre of Inaccessible Island to the Peak of Tristan, and bears from it west by south. The area of the island is about four square miles.

On the N.E. side, where the 'Challenger' anchored, the island presents a range of perpendicular cliffs about 1000 feet in height, resembling those of Tristan. Beneath the cliffs is a considerable tract of uneven lower land, composed of débris from the cliffs above and scattered over with fallen rocks. The vegetation of the cliffs is closely similar to that of those of Tristan; but the lower land is covered over its greater part with a dense growth of the tall reed-like *Spartina arundinacea*, which forms a vast penguin-rookery. Amidst the sea of grass, on the summits of slight elevations, are patches of trees (*Phylica arborea*). The trees grow thickly together, and their branches meet overhead. The ground beneath them is free from tussock, and covered with Ferns, Mosses and Sedges, with *Acæna* (*A. sanguisorbæ*, = *A. sarmentosa*, Carm.) and the Tea-plant (*Chenopodium tomentosum*, Th.) in great abundance, the latter here forming a small bush with woody stems. The trunks of the trees are covered with lichens. In a swamp near the penguin-rookery was found a *Sphagnum* in abundance, and a Sedge (*Carex insularis*, Carm.) different from those noticed elsewhere, together with *Hydrocotyle capitata*, Th., found also in Tristan, but not obtained in flower.

Two Germans, one of whom had been a sublieutenant in the army in the late war, and who is well educated and highly intelligent, have been living on the island for two years. They gave me much information about the plants. They have cultivated potatoes and cabbages and several other vegetables on the island, and have introduced two species of clover, which are spreading rapidly. They probably also brought with them to the island a *Convolvulus*, which is very abundant on the cultivated ground near their hut. The ascent to the top of the island is impracticable from the side on which I was landed; and Captain Nares considered it unsafe to land a boat on the north side, where the path to the summit lies. No plants therefore were obtained from the higher land. The Germans, however, who frequently spent months together there, say that the plants are of the same kinds as those below. But in addition grow the *Empetrum* of the other islands, *Lomaria Boryana*, a *Lycopodium* said by them

to be different from the one found in their company on Nightingale Island (*L. insulare*, Carm., = *L. Selago*, var.), and a small daisy-like flower (*Lagenophora Commersonii*, Cass. ?). The tussock-grass which spreads up the slopes and straggles up the cliffs to the summit, grows also in large patches on the upper plateau. *Phylica arborea* grows in abundance there also, and *Nertera depressa*, the berries of which are the favourite food of the remarkable endemic Thrush of the Tristan group (*Nesocichla eremita*). The berries of *Phylica* are eaten by the Bunting (*Emberiza brasiliensis*). On the sea-shore several species of seaweeds grow in considerable quantity, attached to the rocks in shallow water within the action of the surf. The usual belt of *Macrocystis* ranges along this side of the island.

Nightingale Island.—Nightingale Island is distant from Tristan d'Acunha twenty and a half miles, bearing S.W. by S., and twelve miles from Inaccessible Island, bearing N.W. by W. Its area is about one square mile. There are two small outliers to the west. On the north rises a rocky peak 1100 feet in altitude, continued into a high ridge extending across the island. A broad valley separates this ridge from another lower one running nearly at right angles to it, the highest point of which is 980 feet above sea-level. Tussock-grass covers the whole island with a dense growth, excepting on the summits of the ridges and a few patches here and there on the lower tract, which are occupied by *Phylica arborea.* The tussock here, as at Inaccessible Island, forms an enormous Penguin-rookery. It was found impossible to reach the highest points of the island, the growth of grass being so thick that it was extremely difficult to penetrate. The plants found on the island were the same as those met with on Inaccessible Island, and grew here under the same conditions. A *Lycopodium* (*L. insulare*, Carm.) was found here, however, on the only high ground attained; and a Groundsel-like plant (*Cotula*, sp. n., near *C. australis*), different from the one so common in Tristan, and not found in Inaccessible Island, was extremely abundant, growing even on unoccupied spots in the rookery. Several plants found in the other islands were not seen here, amongst these *Sonchus oleraceus.* The island has never been inhabited, and is visited only in the sealing-time. Two Fungi were found on the dead stems of *Phylica arborea.* A large number of these trees had at one spot been prostrated by the wind and were lying dead. The small outlying islands are covered with tussock, and are rookeries.

The rocky shelves on the coast frequented by the seals, and leading up to their caves, are coated with a thin layer of a small dark green *Ulva*. The rocks and the Algæ were quite dry at the time of our visit, and were some feet above the reach of the ordinary surf. The dried dark-green pellicle on the rock had a peculiar shining appearance, almost metallic. Specimens of the rock, with the Alga attached, are sent to Kew. There is the usual belt of *Macrocystis pyrifera* here, very dense, and difficult for a boat to push through.

Tussock-grass.—Unfortunately the specimens of tussock-grass gathered in Inaccessible and Nightingale Islands were lost out of the vascula in the fight with the penguins and grebes. I have, however, no doubt that the grass is the same as that gathered in Tristan d'Acunha, which is a *Spartina*, doubtless *S. arundinacea*. I gathered specimens of the grass in both islands, and the inflorescence and growth appeared to be identical. In the Penguin-rookeries this grass, known to the inhabitants of Tristan as "tussock," has a habit which appears to be closely similar to that of the Falkland tussock *Dactylis cæspitosa*, as described by Dr. Hooker in the 'Flora Antarctica,' p. 384. The grass grows to a height of five or six feet. It springs in tufts, and forms massive boles or clumps at its base, composed of the contorted bases of the stalks and root-fibres closely matted together. These masses are tough and hard, almost requiring an axe to cut them. The grass thrives best where the ground is saturated with the Penguins' dung. The basal masses gradually pass into a peaty condition; and in the rookeries there are beds of black peaty richly manured soil, thus formed, several feet in thickness. The growth of grass is so dense that it is with the utmost labour that a way can be forced through it, except along the Penguin-roads; and it is so high, that it is only by mounting on an occasional rock, fallen from above, that the direction which has been taken can be made out.

Phylica arborea.—*Phylica arborea* grows, under the shelter of the cliffs of Inaccessible Island, to a height of 20 feet or somewhat more. The trunks are never straight, but usually procumbent and again ascending. The largest which I saw was 1 foot in diameter. On the upper plateau of Inaccessible Island some trunks are said by the Germans to be 1½ foot in diameter; but the trees there are never so high as they are below, being beaten down by the gales. The wood of the tree is brittle, and,

when exposed, rapidly decays, but is serviceable when dried carefully with the bark on. The Germans used it even for handles to their axes and other tools.

Lomaria Boryana attains in some cases a height of 4 feet on the summit of Inaccessible Island.

In all about twenty-nine flowering plants were collected in the three islands. The *Oxalis* appears to be new to the flora, and of interest as having African affinities. Grisebach (Veg. der Erde, ii. p. 546) speaks of there being no change of seasons at Tristan, and consequently an unbroken development of the vegetation. Though some of the plants appear to flower all the year round, others have their regular blooming-season. This is the case with the *Pelargonium* and the Tea-plant. The *Pelargonium* blossoms, according to the Germans, in the middle of summer. Large numbers of the plants come into flower at the same time, so that the beach is thickly strewn with the coloured petals fallen from the cliffs. The Tea-plant was nowhere found in blossom in October, though it is abundant everywhere. *Hydrocotyle capitata* was also not in flower. The *Phylica* trees were all in the same stage of development, bearing fully formed but green fruit.

The close similarity of the flora of the three islands of the Tristan group points to a former connexion between them. Their high cliffs composed of successive layers of lava, and the absence, except in Tristan, of well-marked centres of eruption, as well as their general features, show that they have undergone very great denudation. A sounding between Tristan d'Acunha and Inaccessible Island gave a depth of 1000 fathoms; between Inaccessible and Nightingale Islands the depth was 460 fathoms.

The existence of the Cape-Horn current sweeping up to the islands accounts for the presence of many plants in them. The part of the Brazilian current which turns from the coast of S. America, and runs across to the Tristan group, brings with it many seeds to the island; but these, being tropical, do not germinate. The seeds are cast up on the beach at Tristan, and are familiarly known to the settlers as sea-beans, from a belief that the seeds grow at the bottom of the neighbouring sea. Two of these seeds were shown to me. One of them found cast up in its pod with others, is the bean of a Leguminous tree common at Bahia, pods of which are now sent to Kew * (enclosed now in

* These agree exactly with pods, in the Kew Museum, labelled "*Dioclea reflexa*? Panama."

box no. 5). The other is, I believe, the seed of a *Guilandina*; and, singularly enough, it is the same seed which is cast up occasionally at Bermuda, and is there also called sea-bean, is considered a curiosity, and worn on watch-chains. It is obvious, from the relative position of the three Tristan islands, that the prevalent winds blow directly from Inaccessible Island towards Nightingale and Tristan d'Acunha.

A Tristan settler who had lived for months in Gough Island, told me that the same tree and plants grew there as at Tristan. The ferns, he said, are different. The peculiar thrush and the bunting of Tristan were found also on Inaccessible and Nightingale Islands. The Gallinule, *Gallinula nesiotis*, peculiar to Tristan, has a representative on Inaccessible Island. But, from what the Germans say, the Inaccessible-Island bird appears to be of a very different species and much smaller, perhaps a very different bird.

The thrush and bunting, feeding as they do on berries, have no doubt assisted in the spreading of plants from one island of the group to another.

XVII. Algæ from Tristan d'Acunha, collected by H. N. Moseley, M.A., Naturalist to H.M.S. 'Challenger.' By George Dickie, M.D., F.L.S.

[Read May 7, 1874.]

Laminariaceæ.

Macrocystis pyrifera, *Ag.*

Geogr. distr. Cape G. Hope; Australia; California; Unalaschka and Sitcha.

Ectocarpaceæ.

Sphacelaria paniculata, *Suhr.*

Geogr. distr. Australia; Tasmania; New Zealand; Cape G. Hope.

Rhodomelaceæ.

Dasya obscura, n. sp.

Fronde ramis ramulisque densis, subspongiosa, pinnatim ramosa, ramis alternis; rachi polysiphonia, sursum longius corticata; ramulis densissime dichotomis obtusis; stichidiis lanceolatis, breviter pedunculatis.

Only one specimen, 2 to 3 inches long. Not being able to refer it to any known species, I have thought it may deserve a provisional name.

SPHÆROCOCCOIDEÆ.

NITOPHYLLUM UNDULATUM, *Ktz.*

Geogr. distr. Cape G. Hope.

Mr. Moseley's specimens are not in very good condition, but have both coccidia and tetraspores; they are very dwarf, but seem to belong to the species mentioned.

RHODYMENIACEÆ.

PLOCAMIUM COCCINEUM, *Huds.*

Geogr. distr. In numerous localities, both hemispheres.

CRYPTONEMIACEÆ.

GIGARTINA RADULA, *Esp.*

Geogr. distr. Cape G. Hope; New Zealand; Auckland and Campbell Islands; Western shores of N. America.

CALLOPHYLLIS DISCIGERA, *J. Ag.*

Geogr. distr. Cape G. Hope.

IRIDÆA CAPENSIS, *J. Ag.*

Very small specimens of var. *β*.

Geogr. distr. Cape G. Hope.

EPYMENIA OBTUSA, *Grev.*

Geogr. distr. Cape G. Hope; Auckland Islands; Cape Horn.

GYMNOGONGRUS CAPENSIS, *J. Ag.*

The specimens collected by Mr. Moseley comprehend two forms of the species.

Geogr. distr. Cape G. Hope.

CERAMIACEÆ.

MICROCLADIA MOSELEYI, n. sp.

Fronde sursum compressa, cæspitosa, parce dichotoma, apicibus obtusis incurvis, sphærosporis irregulariter dispositis.

There are already four known species of this peculiar genus, viz.:—*M. glandulosa*, found in S. Britain, France, Spain, and the Mediterranean; *M. Coulteri*, Harv., from California; *M. borealis*, Rupr., found at Nootka, Fort Vancouver, Unalaschka, and Golden Gate, California; Kützing has described *M. tenuis* from Gaboon, Guinea. This new species, which I have named after the dis-

coverer, seems in general habit to be nearest to the British, but differs in being more simple in the form of the terminal ramuli and distribution of the tetraspores; the transverse section also shows a greater number of large cells surrounding the central tube.

CENTROCERAS CLAVULATUM, *Ag.*
Geogr. distr. Widely distributed in both hemispheres.

C. OXYACANTHUM, *Ktz.*
Geogr. distr. Cape G. Hope.

ULVACEÆ.

PORPHYRA LACINIATA, *Ag.*

P. VULGARIS, *Ag.*
Geogr. distr. Both these are cosmopolites.

CONFERVACEÆ.

CLADOPHORA HOSPITA, *Mert.*
Geogr. distr. Cape G. Hope.

XVIII. Algæ from Inaccessible Island, near Tristan d'Acunha, collected by H. N. MOSELEY, M.A. By GEORGE DICKIE, M.D., F.R.S.

[Read May 7, 1874.]

CORALLINACEÆ.

ARTHROCARDIA CORYMBOSA, *Lam.*
Geogr. distr. Cape G. Hope.

CRYPTONEMIACEÆ.

GYMNOGONGRUS CAPENSIS, *J. Ag.*
Geogr. distr. Cape G. Hope.

GIGARTINA RADULA, *Esp.*
Geogr. distr. Cape G. Hope.

CERAMIACEÆ.

CENTROCERAS OXYACANTHUS, *Ktz.*
Geogr. distr. Cape G. Hope.

CONFERVACEÆ.

CLADOPHORA HOSPITA, *Mert.*
Geogr. distr. Cape G. Hope.

XIX. On the Botany of Marion Island, Kerguelen's Land, and Yong Island of the Heard Group. By H. N. MOSELEY, M.A., Naturalist to H.M.S. 'Challenger.' (In a Letter to Dr. HOOKER, F.R.S. &c.)

[Read June 4, 1874.]

WE only touched at Marion Island before landing at Kerguelen. I had a day there to collect plants, but could not go any great distance from the ship. The plants I found were:—

Ranunculus crassipes.
Pringlea antiscorbutica.
Cerastium, sp.
Acæna affinis.
Callitriche verna.
Montia fontana.
Bulliarda moschata.
Azorella Selago.
Festuca Cookii.
Lycopodium Selago.
Lycopodium clavatum.
Hymenophyllum Wilsoni.
Aspidium mohrioides.
Lomaria alpina.
Polypodium australe.

The vegetation is thus closely similar to that of Kerguelen's Land, but less abundant in species, as might be expected, from the great difference in area.

Other plants may occur; for I examined but a very small part of the island, and the ferns at least were somewhat scarce and difficult to find, except *Lomaria alpina.* I could find only the one grass, though I searched carefully for others. I found the *Azorella* tuft to have an internal temperature higher than that of the air, in one case as much as 5° F. The peculiar form of the tufts is perhaps connected with the storing of heat. No landing, unfortunately, was effected at Prince Edward's Island, nor at the Crozets. At Kerguelen I found only two plants new to the flora—a *Cerastium* and an *Uncinia.* The *Cerastium* was abundant about the shore, towards the south and middle of the leeward side of the island; the *Uncinia* I found on only one restricted area on the slopes of Mount Bromley in Swain's Bay. The plant is very like *U. Kingii* figured by you in 'Flora Antarctica.'

I made a pretty large collection of the plants of the island, including *Pringlea* and *Lyallia* in all stages of flower and fruit. Some specimens of these latter I preserved in spirits. I also filled three Wardian cases with Kerguelen plants, and especially *Pringlea*. I have about two dozen cabbage-plants living on board now in good condition, also *Lyallia*, *Azorella*, *Leptinella*, *Galium*, *Bulliarda* and some sickly *Acæna*. One case will probably be sent home at once by this mail. The only difficulty in keeping them was to prevent their dying from damp. I was obliged to keep the cases open and have them wiped inside every day. We had very little time at Christmas Harbour; and I was engaged during that time in collecting plants, so had only time for a very short visit to the fossil-wood and coal beds. I could find no fossil leaves or any thing recognizable in form, except something a little like a *Chara*. Prof. Thomson had boxes of coal and wood preserved. We unfortunately did not visit Greenland Harbour at all.

At Yong Island I had a chance of landing for about two hours with Captain Nares and Buchanan. We were the only ones lucky enough to get on shore. Next day the wind shifted and it snowed, and we had to go. Numerous glaciers come right down on to the shore. The vegetation is most scanty, most of the land surface not covered with ice being bare. I found only five flowering plants, and one or two mosses and a liverwort. The plants were:—*Pringlea*, *Azorella*, *Colobanthus*, *Callitriche* and *Festuca*, all apparently of the same species as at Kerguelen. I believe there are no others in the island. The *Pringlea* is very much dwarfed. There is no *Macrocystis* about Yong Island, only *Diervilla*; but there are beds of other seaweeds cast up on the shore. We looked for Wilkes's Termination Land, but found it mythical. We found the sea-bottom down south made up of diatoms, as you did, and the surface covered with diatoms, the ice stained with them. Two boxes will be forwarded to you this mail, a list of the contents of which I enclose. Besides these, there will reach you a cigar-box full of *Pringlea*-seed. I found abundance of ripe seed to the south of Kerguelen, near Mutton Cove in Royal Sound.

XX. List of Plants collected by H. N. Moseley, M.A., on Kerguelen's Land, Marion Island, and Yong Island. By Prof. Oliver, F.R.S.

[Read June 4, 1874.]

	Kerguelen's Land.	Marion Island.	Yong Island.
Ranunculus crassipes, *Hk. f.*	1		
—— biternatus, *Sm.*	……	*1	
—— sp. an nova? an var. R. crassipedis	*1		
Foliis phyllodineis apice vix dilatatis integerrimis. R. limoselloidi, *F. M.*, similis, differt petalis stylisque.			
Pringlea antiscorbutica, *Hk. f.*	1	*1	*1
(We have it also from the Crozets.) Flores apetali; stamina 6, elongata libera, 4 longiora per paria sepalis anticis posterisque opposita; carpella lateralia.			
Lyallia kerguelensis, *Hk. f.*	1		
Stellaria media, *L.*	……	*1	
Montia fontana, *L.*	1	*1	
Cerastium triviale, *Lk.*	*1		
Colobanthus kerguelensis, *Hk. f.*	1	……	*1
Acæna (affinis, *Hkf.*) ascendens, *Vahl*	1	*1	
The Kerguelen's-Land specimens have filaments 3–4 times as long as the anther. The difference is doubtless sexual.			
Tillæa moschata, *DC.*	1	*1	
Callitriche antarctica, *Engelm.*	1	*1	*1
Azorella Selago, *Hk. f.*	1	*1	*1
(We have this also from Crozets.)			
Cotula (Leptinella) plumosa, *Hk. f.*	1		
Galium antarcticum, *Hk. f.*	1		
Limosella aquatica, *L.*	1		
Juncus scheuchzerioides, *Gard.*	1		
(Forma juvenis.)			
Uncinia, sp. nov.? affi. V. compactæ	*1		
An ejusdem var.? a V. Kingii, differt: inflorescentia spiciformis, perigynia squama breviora.			
Festuca Cookii, *Hk. f.*	1	*1	
—— ——, var.	……	……	*1
—— erecta, *Gard.*	1		
Aira antarctica, *Hk. f.*	1		
Triodia kerguelensis, *Hk. f.*	1		
(Two forms.)			
Poa pratensis. *L.*	*1		
—— annua, *L.*	*1		
Agrostis antarctica, *Hk. f.*	1		

* The species hitherto unrecorded from Kerguelen's Land are marked *. All the Marion and Heard Island plants are new.

TABLE.—*continued.*

	Kerguelen's. Land.	Marion Island.	Yong Island.
Gramina dub. (odorata)	......	*1	
Specimen imperfect, undetermined.			
Vascular Cryptogams (by Mr. Baker).			
Lycopodium Saururus, *Lam.*	1	*1	
—— clavatum, var. magellanicum, *Sw.*	1	*1	
Lomaria alpina, *Spr.*	1	*1	
Aspidium mohrioides, *Bory*	......	*1	
Polypodium australe, *Mett.*	......	*1	
Hymenophyllum tunbridgense, *Sm.*	......	*1	

Mr. Moseley's collection includes all the species recorded from Kerguelen's Land in 'Flora Antarctica,' and, in addition, two grasses, probably introduced, and *Cerastium triviale*, Link, also a *Ranunculus* and an *Uncinia*, which may be new.

Note on Lyallia kerguelensis, *Hk. f.*

Mr. Moseley sends numerous specimens in flower preserved in fluid. To complete Dr. Hooker's description (flowers were wanting in his specimens) (Fl. Antarct. ii. 548, tab. 122; Gen. Plant. i. 153), add :—

Sepala 4 libera oblonga v. oblongo-elliptica, subæqualia v. interiora lateralia paulo angustiora, per paria decussata. Petala 0. Stamina* 3, quorum 1 anticum sepalo oppositum v. suboppositum, 2 postica sepalis alterna, vel stamina 2, 1 anticum, sepalo oppositum 1 posticum sepalis alternum; filamenta filiformia sepalis subæqualia, antheræ parvæ rotundatæ biloculares. Ovarium ellipsoideum glabrum; stylus ovario æquilongus breviter bifidus lobis ovato-oblongis lateralibus intus margineque papillosis; ovula sæpe gemina.—Flores intra folia superiora arcte imbricata axillares brevissime pedicellati, pedicello basi bracteolis 2 lateralibus anguste cymbiformibus incurvis apice apiculatis instructo.

* Stamens do not appear to be constant in position. I have one memorandum of a diandrous flower in which the stamens were opposed to the anterior and posterior sepals respectively, but I am not quite confident of its accuracy.

Note on the Bracts of Crucifers. By M. T. MASTERS, M.D., F.R.S., F.L.S.

[Read February 19, 1874.]

SOME time since I had the opportunity of examining a specimen of the Red Cabbage, which, in addition to other changes, possessed well-marked bracts beneath the flower-stalks (fig. A). The bracts, moreover, were inseparate at the base from the corresponding parts of the peduncle (fig. B). The specimen is interesting in relation to certain contested points of vegetable morphology; I may therefore, perhaps, be permitted to allude briefly to some of these points, and to indicate wherein the specimen alluded to confirms or invalidates the explanation of particular points of structure put forth by various observers.

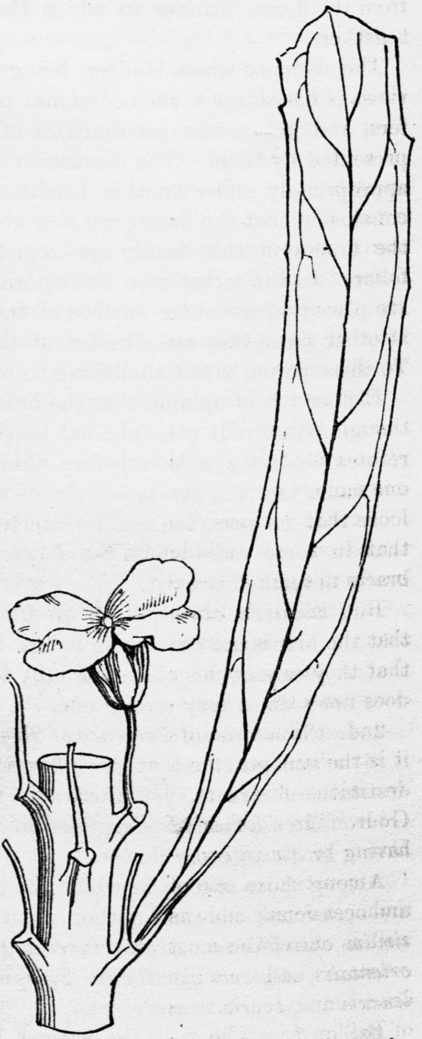
A. Vertical section of Red Cabbage, showing axillary leaf-buds and two flowering shoots with leafy bracts, much reduced.

1st. *The Absence of Bracts in Crucifers.*—This constitutes one of the most remarkable as well as one of the most constant and readily observed peculiarities of the order. The absence is, in the majority of cases, complete, so much so, even, that in the earliest stages of

development observed by Payer * no trace of bracts was seen. Warming confirms this opinion. It is no wonder, then, that morphologists have paid much attention to the circumstance with the view of elucidating its cause.

A. P. de Candolle attributed the absence of bracts to a congenital suppression of the parts in question, or, as he calls it, "avortement prédisposé" †; Turpin arrives at a similar conclusion, but attributes the abortion to pressure.

Godron ‡, in discussing this subject, inquires whether the absence of bracts is due to a special organization of the inflorescence, in virtue of which the peduncles are detached by *dédoublement* from the main axis of the inflorescence, or whether the bracts, to which the peduncles should be axillary, are abortive. Godron's reply to these questions is to the effect that the absence of bracts,



B. Portion of the inflorescence, nat. size, showing leafy bract, inseparate at the base from the flower-stalk. The bracts are deciduous, and on falling, leave a scar at the point where they separate from the flower-stalk, as shown in the figure.

* Organogénie Végétale, p. 210.

† Mém. sur la famille de Crucifères (1821), p. 14; and Mém. Mus. vii. p. 193.

‡ Mém. sur l'inflorescence et les fleurs des Crucifères, Ann. Sc. Nat. ser. 2, v. p. 281.

as well as sundry other modifications of structure, are to be attributed to pressure acting from within outwards and resulting from the dense manner in which the young flowers are packed together.

The evidence which Godron brings forward in support of his views is based upon the occasional presence of bracts in Crucifers, and on certain peculiarities of appearance and structure presented by them. The discussion of these matters comes more appropriately under another heading. Norman * arrives at the conclusion that the bracts are abortive; and he is of opinion that the bracts in this family are sometimes stipulary, sometimes foliar. In the latter case their position varies: sometimes they are placed on the outer surface of the peduncle, above its base; at other times they are situated at the base of the flower-stalk. To these points also I shall have to revert.

Eichler † is of opinion that the bracts of Crucifers are abortive, though potentially present; but he (in my opinion) successfully refutes Godron's notion before alluded to, by showing, on the one hand, that the bracts are absent where the inflorescence is so loose that no pressure can be exerted, and, on the other hand, that in some cases where the flowers are densely crowded the bracts nevertheless exist.

But Eichler's objection to Godron's views based on the fact that the bracts are developed before the flower-buds, and hence that they cannot be obliterated by them in course of growth, does not seem a very strong one.

2nd. *The occasional Presence of Bracts in Crucifers.*—Although it is the general rule that the inflorescence of Crucifers should be destitute of bracts, yet there are frequent exceptions; thus Godron cites *Sisymbrium supinum* and *S. hirsutum* as constantly having bracts to every flower.

Among those species in which the presence of bracts is partial and occasional, the same author mentions *Brassica oleracea*, *Erysimum cheiriflorum*, *Arabis turrita*, *Hesperis matronalis*, *Bunias orientalis*, *Alyssum maritimum*, *Sinapis arvensis*, *Erysimum ochroleucum* and *Iberis sempervirens*.

Baillon ‡ says that all the species belonging to the following genera have bracts more or less developed—*Porphyrocodon*

* Ann. Sc. Nat. ser. 4, ix. (1858), p. 105.

† In Martius's Flora Brasiliensis (Cruciferæ, p. 337).

‡ Hist. des Plantes, Crucifères, p. 215.

(= *Cardamine picta*, Hook. Lond. Journ. Bot. 1837, t. 12), *Stenonema*, *Psychine* (Desf. Fl. Atlant. ii. 69, t. 148), *Dipterygium*, *Schizopetalon* (Bot. Mag. 2879), and *Ionopsidium*, while they occur occasionally in various species of *Sisymbrium*, *Barbarea*, *Nasturtium*, *Enarthrocarpus*, *Streptanthus*, *Syrenia*, *Vella*, *Boleum*, and *Notothlaspi* (Hook. Ic. Pl. 848, sub *Hutchinsia*; *Stenonema* = *Leptonema*, Hook. Ic. Pl. 692). Bracts have also been observed in *Cheiranthus Cheiri*, *C. laxa*, *Erucastrum Pollichii*, *Brassica lyrata*, *Cardamine ovata*, *C. nasturtioides*, *C. pratensis* and *Sisymbrium curvisiliquum* *.

Guillard † mentions the following species as occasionally provided with bracts—*Farsetia*, sp., *Arabis auriculata*, *A. hirsuta*, *Biscutella ambigua*, *Brassica montana*, *Capsella Bursa-pastoris*, *Cochlearia glastifolia*, *Diplotaxis erucoides*, *D. tenuiflora*, *D. viminea*, *Sinapis arvensis*, *Thlaspi arvense*, *Sisymbrium Columnæ*, *Lepidium campestre*, *L. sativum*, *Brassica oleracea*, and *Cheiranthus himalayensis*.

I have myself met with the occurrence in the wild form as well as in cultivated varieties of *Brassica oleracea*, in *Mathiola incana*, *Draba incana*, *Cochlearia officinalis*, *Erysimum orientale*, as also in many of the genera above mentioned.

3rd. *The Position of the Bracts.*—In those cases where bracts are observed in Crucifers the position of the parts in question varies in different instances. It most commonly happens that the bracts occur beneath the lowermost peduncles, but are absent from the upper parts of the inflorescence. The bracts frequently occur where there is a tendency in the ordinary racemose inflorescence to develop into a panicled one. In this case they may often be found at the base of the secondary divisions of the inflorescence, though absent elsewhere. The situation of bracts at the base of the peduncles, however, is not a matter of sufficient interest to demand more than a passing notice. It is otherwise when the bracts are seemingly or really placed on the flower-stalk itself and not at its base. In some instances, as in *Arabis turrita*, the lowermost peduncles have bracts at their base, the intermediate ones have bracts springing from their outer surface above their base, while the uppermost have none at all. In other instances all the bracts proceed from the side of the flower-stalk,

* Nov. Act. Comm. Bon. vi. p. 227, tab. 10, f. 1; Henfrey, Botanical Gazette, i. p. 308; iii. p. 84.

† Bull. Soc. Bot. France, 1857, p. 265.

with which they are usually said to be fused. Thus Godron cites *Bunias orientalis*, *Alyssum maritimum*, *Sinapis arvensis*, *Iberis sempervirens*, and many others. This also was the state of things in my own specimen of *Brassica oleracea* (fig. B). It must also be remembered that an apparent displacement of a similar character is of very common occurrence in many plants, such as in many Solaneæ, Boraginaceæ, in some species of *Thesium*, *Spiræa*, *Agave*, *Tilia*, notably in various species of *Sedum*, and, indeed, in a large number of very different families. Whether the cause producing this effect is the same in all these instances, may fairly be doubted; in any case, it is desirable that each instance should be examined for itself. In the following remarks, unless it is otherwise mentioned, I have confined myself specially to the bracts of Crucifers, and, indeed, to those of the particular specimen alluded to.

That the causes of this position of the bract may, however, be various is, I think, rendered the more probable from the different explanations that have been given by competent observers. Some of these may fit particular cases and be inapplicable in others. It can hardly be that they are absolutely incorrect in all cases. Further evidence of this will be offered in the sequel.

The peculiar position of the bract when it emerges from the side of the peduncle above the base has been attributed, 1st, to a partition or subdivision of the growing point. This explanation was applied by Clos *, and, following him, by many other botanists, to a class of cases wherein the inflorescence is for the most part destitute of bracts, and which has been sometimes called *inflorescence de partition*. According to this view, the axis divides in these cases into two parts; the weaker of the two bears a flower, while the other is prolonged to form the rachis, to divide again in the same manner, and so on. At first sight this explanation appeared satisfactory; but the minute examination which has since been made of the tissues of the growing point and of the way in which new organs originate at different depths and from different layers of the growing point, has shown that

* Clos, "Généralité du phénomène de partition dans les plantes, explication de l'absence de bractées chez les Crucifères et autres végétaux," Bull. Soc. Bot. Fr. ii. 499 (1855).

there is in reality no partition such as Clos, Germain de Saint Pierre, and others have alleged.

Warming * in particular, who has paid special attention to this point, denies the existence of any partition of the growing point at the very place where the displacement of the leaf is greatest, and where, in consequence, the evidence of partition, did it exist, ought to be most striking, as in *Solanum*, *Datura* *Petunia*, *Sedum*, &c.

2nd, the appearance in question has been referred to a union or fusion between the upper or inner surface of the bract at its base and the peduncle. Norman is of opinion that the "primitive union" of the bract of *Cruciferæ* with the peduncle is incontestable. This is the view I am myself inclined to adopt, although it would be preferable to call the so-called union or fusion a want of separation; for, as Norman very well puts it, "the union is primordial; that is to say, the leaf and the stem have in such cases never been separated."

This also is the view adopted by Godron, who points to the "decurrent" lines proceeding from the base of the bracts down the stem in many Crucifers as evidence of the fusion or inseparation in question, the decurrent lines being, of course, assumed to be constituted by the vascular bundles or ribs of the bracts. These lines were plainly visible in the cabbage which is figured at B. Even in cases where the limb of the bract is undeveloped the lines may occasionally be seen on the stem, as in *Alyssum maritimum*.

3rd, Warming attributes the phenomenon in question to a raising or uplifting of the bud and its bract by the growth or lengthening of the supporting stalk. According to the views of this morphologist, the bud and its subtending bract are always united at their base from birth. "It is thus easy to understand," he continues, "that the primitive union between these organs may become more complete by a subsequent growth of the basilar portion common to both, which may thus lengthen and thrust up the bract from its normal position"†.

It may here be incidentally mentioned that Warming indicates a contrast between the *feuille-mère* and its attendant bud in the case of the leafy portion of the stem and of the inflorescence re-

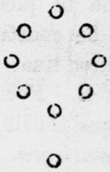
* 'Recherches sur la ramification des Phanérogames, Résumé français,' xix.

† See also Caruel, An. Sc. Nat. ser. 5, t. vii. (1867), p. 110.

spectively. In the leaf-bud the *feuille-mère* is in advance of the bud in its development, whereas in the inflorescence it often happens that the bud appears long before its attendant bract, while in some cases (as in Crucifers) it is not developed at all.

Payer * and Sachs † refer similar instances to a "sympode," in which the bract (*feuille-mère*) in whose axil a branch is developed becomes fused with (or rather is never separated from) that branch, and is carried up with it to a certain height.

The balance of evidence is therefore, numerically, in favour of attributing this peculiar displacement to a congenital union, in fact to a lack of separation. If, however, this explanation be universally true, ought we not to find evidence of it in the distribution and course of the vascular bundles? How, indeed, are we to tell in the adult state where a leaf starts away from its supporting axis but by observing the point at which the vascular bundles are given off? Now in the cabbage which furnished the occasion for these remarks a transverse section of the peduncle at various points below the apparent point of emergence of the bract, revealed the existence above of a circle of vascular bundles eight in number ‡, corresponding to the flower-stalk, while beneath there was a single central bundle separated from the foregoing by intervening cellular tissue, as shown in the diagram annexed.



This, then, would appear to indicate that the peculiar position of the bract in this case is really due to a congenital union or lack of separation between the peduncle and the bract. The part of the latter which is united is probably the petiole, seeing that it is traversed by only a single vascular bundle, and bearing in mind that the laminar portion of the bract is ultimately deciduous from the apex of the combined leaf and flower-stalk, where a scar is left after the fall of the bract (fig. B). But this disposition of the vascular bundles is not universal in Crucifers, which have some of, or all their bracts springing, really or apparently, from the outer surace of the peduncle. Of this I had evidence in the case of a

* Payer's 'Eléments de Botanique' (1857), p. 117.

† Lehrbuch, French edition ('Traité de Botanique'), par Van Tieghem, p. 270 (1873).

‡ Van Tieghem, 'Anat. Comp. de la Fleur,' p. 180 (1871), also says there are eight bundles of vessels at the upper part of the pedicel. I found eight throughout the whole length of the pedicel.

double stock (*Mathiola*) lately examined, and in which a transverse section of the peduncle from which the leaf sprang, made at different heights, revealed the existence throughout of an unbroken cylinder of vessels.

In *Sedum spectabile*, wherein this arrangement of bracts exists in a very marked degree, there is no double vascular system, but only a single circle up to the very point of emergence of the bract. An examination of the course of development in the inflorescence of this plant shows that there are three marked stages, as indicated in the accompanying diagram:—1, in which the bract springs apparently from the main axis, and the bud is sessile in its axil; 2, in which there is an elongation of the pedicel below the bract (the bud now appears stalked, with the bract at the top of the stalk immediately subtending the bud); in the third stage (3) the pedicel or stalk of the bud is not only elongated below the bract, but also above it (the bud now appears on

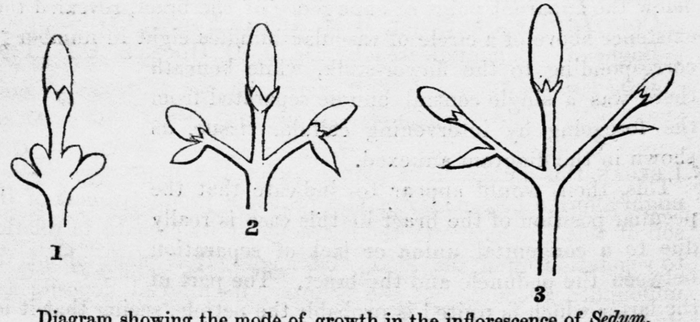


Diagram showing the mode of growth in the inflorescence of *Sedum*.

the summit of the stalk, while the bract appears to arise from its side).

In *Solanum Dulcamara*, under like circumstances, there is only a single cylinder of vessels. In *Spiræa Fortunei* or *S. callosa* the peduncle from which the bract emerges has more or less of an angular outline, and is sometimes completely pentagonal; but there is no trace of fusion or of separation of the vascular bundles, except at the very point of emergence of the bract.

From what has been said, it may be inferred that the position of the bract in these cases, though to outward appearance the same, may be due to two different circumstances, viz.:—congenital union (that is to say, lack of separation) as in the Cabbage;

or a growth at the basal portion of the pedicel below the bract, as a consequence of which the bract is raised from its normal position to a higher level, as in *Sedum*. I may illustrate my meaning by a reference to the buds of the Alder, which, as is well known, are not sessile, but stalked. The basal portion of the pedicels bearing bracts upon the surface would, on this view, correspond to the stalk of the bud in the Alder. It will be seen that this latter view is essentially the same as that of Warming; but although in this particular instance my observations tend to confirm his, yet I am not prepared to assent to his theory that the base of the bud and the base of its subtending bract are in all cases primordially inseparate. This, it appears to me, is a point upon which further evidence is required before it can be finally assented to*.

Some Observations on the Vegetable Productions and the Rural Economy of the Province of Baghdad. By William Henry Colvill, Surgeon-Major, H.M. Indian Forces, Civil-Surgeon, Baghdad. Communicated by Dr. J. D. Hooker, C.B., Pres. R.S., F.L.S., &c.

[Read February 19, 1874.]

I began this collection of plants under the impression that it might afford a better idea of the probable productiveness of the soil of this province, and the character of its climate in relation to vegetation, than the loose statements often made about the unbounded resources of the country, its alluvial deposits and its two navigable rivers.

In this point of view, the first thing that strikes me is the smallness of my collection; for, though I searched diligently myself and employed others to search for me, I have got only about one hundred species. In endeavouring to account for the scarcity of wild flowers in what was once the garden of the world, we must remember that the strip of alluvial land watered by the Euphrates and Tigris, and lying between the Arabian desert and the tableland of Persia, appears in some measure to have a flora to itself. That is to say, plants abounding in

* See also Eichler, "Ueber die Blattstellung einiger Alsodeien," Flora, 1870, n. 26, where a similar uplifting of one of a pair of "geminate" leaves is described.

the desert * are scarcely to be found here, while many plants of Persia, such as the Daisy and Buttercup, do not approch nearer to Baghdad than thirty miles.

Though this soil is rich, and rain falls in the early spring to a depth of from 18 to 28 inches, still both soil and climate are ill-adapted for plants that do not begin and end their vegetative season between February and the beginning of June.

There is not a hollow to shade a plant or retain moisture; there is not a stream in the country; there is no land of intermediate character between the flat, dry plain and the reed-bearing swamp. The rivers, with a rise and fall of about 30 feet, closely resemble at the low season a recent railway-cutting, while hot winds blow from May to October. This would account for the plants of Persia not thriving; but why not those of the desert? It may be that the soil is too rich for some; but the cause is probably to be looked for in the different conformation of the surface in the desert, which is all ridges and hollows—ridges of sandstone and hollows of light soil with rock underneath; and rain-water remains longer in this light soil over the bottom of rock than it does on the clayey alluvium, where it is liable to evaporate before it has time to sink in. Even where the desert is sand, it is blown into ridges and hollows. The vegetation of Turkish Arabia may be regarded as confined to a narrow strip adjoining the rivers.

Grapes.—The grapes are nowise remarkable either in appearance or variety. The chief grains cultivated are barley and wheat. There are three varieties of barley—one, the "Sburgalan," with five rows of seeds on the head. This variety, it is said, produces three times as much as any other barley, and was at one time very abundant in the province; but it seems to have become scarce since the flooding of the country in the spring of 1867. The second variety is the "black barley," which is best for feeding horses, and sells a little cheaper than the others. The third is called "Aragi," and is used for making bread, though it is not considered so good for that purpose as the Sburgalan. There are three varieties of wheat. One, called the "Kurd wheat," is grown near the base of the hills. It has a small grain, and is considered better than the others. The Baghdad wheat is grown on the purely alluvial soil; while the third variety, known as the

* I made a small collection of desert plants on my way to Riadh with Col. Pelly in 1864. They were sent to Kew.

"Camel's tooth," has a large grain, and is not used for making bread; but the grain is boiled whole and eaten in the same way as rice.

Barley-sowing begins about the middle of October; but the sowing of wheat does not begin till the end of November. There are four modes of watering the soil. One is by wells on the river-bank, where the water is raised in skin buckets, chiefly by horses; but occasionally bullocks are employed. The second is by means of the few old canals still in partial order, where the water is either on a level with the ground and has only to be let out, or so nearly so that it can be raised with ease. In the third mode the grain is thrown along the margin of a marsh as the water recedes; whilst, on the fourth plan, the seed after being put into the ground is simply left to be watered by any rain that may chance to fall. In the first mode of irrigation, a well with three buckets, working nine horses, three to each bucket, supplies water for one ton and a half of wheat and three tons of barley-seed—that is, for four tons and a half of seed in all; but this does not pay the farmer unless he grows a summer crop, consisting of onions, beetroots, turnips, melons, cucumbers, brinjals and bamias (*Abelmoschus esculentus*).

One horse draws 17,700 gallons a day, working for six hours, the three horses being at work for eighteen hours a day; and, unless when rain has fallen in abundance, and in the autumn during the ploughing, when the horses are employed in watering only on alternate days, they are at work watering the ground all the days of the year.

These animals are usually mares reared on the farm. They produce their foals in the early spring, when, on account of rain, their services are less required. They are fed on the farm on barley and chopped straw, the straw of the black barley being preferred. This can be told by its smell. For thirty or forty days in spring they are let loose in the field to graze on the young barley. A large part of the barley in the neighbourhood of towns is cut before it gets into ear; for there exists a curious custom of taking the shoes off riding-horses, tying them up in the stable, and feeding them for thirty days on nothing but green barley. For ten days it is given as a purgative; for the next ten days it is supposed to purify the blood; and during the remaining ten days the horse is said to lay on flesh.

The farm-horse, besides drawing water, does the ploughing,

which begins on the appearance of Canopus, on the 10th of September; and he also helps, if near a town, to carry the farm-produce to market. In these parts horses are almost invariably used for irrigation, and occasionally a few bullocks; but in Neja, round Riadh, for example, the work is done by camels.

In the second mode of irrigation, that by the old canals, from which the water can flow without the need of lifting-power, all animals (horses, bullocks, and donkeys) are employed in ploughing; but when the water is at a somewhat lower level more horses have to be kept.

In the cultivation of the soil on the margin of marshes, there is a continuous ploughing as the ground left by the retiring water becomes fit for the process. The ground sown in the hope of rain is considered the least important, and the ploughing is done at odd times.

Ground irrigated in the first mode, provided the soil is good and water abundant, is expected to return twenty-fold. If the ground is poor it is manured for barley, but never for wheat; the reason given being that wheat never requires manure.

It is scarcely possible to give an estimate of the area of cultivation dependent on each of those different modes of irrigation; but in 1871, after three years of drought, with no rain, also no flooding of the rivers (for no snow had gathered on the Persian hills at their source), and therefore no marshes, the price of wheat was twenty-two shillings a hundred pounds, and that of barley sixteen shillings, whilst in this year, 1873, after quite the usual amount of rain and flooding, the prices are six shillings for a hundred pounds of wheat and two-and-sixpence for the same weight of barley. This shows how small an extent of land is watered solely from wells; for it is to be observed that in the year of scarcity, dates, so large an article of food, were abundant, and meat cheaper than usual, because owners chose to sell their sheep for next to nothing rather than allow them to die of starvation; moreover grain was imported from India.

The grain here is trodden out as of old, the ox being unmuzzled, and it is winnowed by the wind; the straw is cut by rude revolving knives.

Taxes are levied on the produce, and in kind. There are four different rates of taxation according to the nature of the irrigation employed. First, land watered by wells pays one tenth. The grain, after being winnowed, is thrown into heaps, and the

Surveyor takes the Government tenth. The summer crop of cucumbers, melons, &c. pays one tenth of the sum realized by the loads which are daily brought into the market for sale. Secondly, land watered by the old canals first pays one fifth of the produce; the remainder is then divided into thirds, and the Government again takes one of these thirds; so this land pays to Government four fifteenths of its produce. Thirdly, the tax on grain grown on the marsh land is rather less, namely one third, this land being subject to the risk of flooding. Lastly, grain grown on land dependent entirely on rain pays one tenth, and, if (as is generally the case) the land is claimed by Government, one fifth of the remainder.

It has of late years been a question whether steam-pumps for irrigation can be profitably employed. Three are now in use; and the coal costs £4 sterling a ton. Simple suction-pumps are sufficient for the purpose, as the water has never to be raised so high as 30 feet. At present, however, it is scarcely possible to arrive at a trustworthy conclusion as to the expediency of using pumps, on account of the hot partisanship with which the question is discussed. It would most probably be safe to say that pumps might be profitably used in a year of scarcity, when wheat rises to twenty-two shillings a hundred pounds; but when the price is only six shillings for that quantity I should doubt it. I may add that the Turks have given up using the two pumps belonging to them, because it has been found that they did not pay.

As the winds here are strong and steady throughout a great part of the year, it has seemed to me that a combination of wind-mill and steam-pump might probably be found to answer, the steam of course being used as auxiliary. Be this as it may, so sure as pumps worked on an improved plan are found to be profitable, so surely, if they are in any considerable number, will the Government impose a tax upon them to the loss of the poor cultivator. It might be said that if the improvements were made and worked by enterprising foreigners, their Consuls might protect them against extra impositions; but then, it is not to be wished that the native inhabitants should be superseded in the cultivation of the soil by foreign adventurers.

Moreover the question affects only a strip of land along the river-banks; for the wells situated more inland are almost always too brackish for the purpose of irrigation. It appears to me,

however, that the mode of irrigation most suited to this country would be by canals, after the fashion of the ancient works of this kind, of which a few are still in partial operation. In ancient Mesopotamia three large canals, supposed to have been navigable, crossed the country above Babylon, leading from the Euphrates to the Tigris and giving off very many branches. Higher up than these there is another large canal which seems never to have been finished, but is still in fair order. This is the Saklawiyeh, which opens from the Euphrates forty-five miles west and a little north of Baghdad. This canal runs E.S.E. for the first twenty miles of its course, and is 60 yards wide and from 12 to 20 feet deep. At the modern fort (enclosure) of Kala Abadeah the canal turns more east and runs on for ten miles more, when it ends abruptly. The difficulty of managing these canals is at the mouth; for there the river either persistently throws up a bank which blocks the opening, or as persistently widens that opening so as to make the water unmanageable.

Three or four years ago the Government built massive piers of solid masonry at the mouth of the Saklawiyeh canal, with the intention of placing iron gates there; but the foundation was sand, and on the first rise of the Euphrates the piers toppled over, and there they still lie. Another attempt was then made further in, where the foundation is a crumbling sandstone; but these piers have not yet risen more than 2 feet above their foundation.

Here, then, is a large body of water with the land of Mesopotamia to the south-east and on a slightly lower level, and intersected by the three supposed navigable canals. It would be a matter of no difficulty (and I believe the outlay would be inconsiderable compared with the return) to open this canal into the Abugeraib, the first supposed navigable canal, then the Abugeraib into the Ruthwaniyeh, and this into the Abu Debbis; and were these canals thoroughly opened, water would be supplied to 3500 square miles of alluvial land; and there need be only one opening on the river to the whole system.

Labour for digging canals can be easily got, to a certain extent, if paid in ready money, the price being two pence a cubic yard, with the earth thrown up on either side to form a bank. It must, however, be explained that, excluding the town population, there are but six persons to the square mile; and that is, including the roving Bedouins. But to conduct the work indicated it would be

necessary to employ a competent engineer, who should be entirely independent of the local government; for each succeeding Governor (and they follow rapidly now) seems to consider it a part of his duty to upset the work of his predecessor. I believe that a sum of money not greater than what has been squandered in the province on comparatively useless projects during the last three or four years, would, if fairly applied towards the improvements suggested, go a long way to make Mesopotamia a garden again.

Three varieties of rice are grown—a black kind near Baghdad, another kind on the desert side of the Euphrates, and a third at Mendali near the Persian frontier; but the supply is not equal to the local consumption, and rice has to be imported from India and Persia.

Millet (*Panicum miliaceum*) and Ethera (*Sorghum vulgare*) are also grown, but only in small quantity. The Wild Oat has at some time got mixed with the cultivated grain, especially barley, and is becoming more abundant every year; but as yet it does not produce a grain of any size.

Palms.—The only Palm in this country is the Date; but whether or not it is indigenous is a matter it would be useless to inquire into. The only place in which it could live a season in the wild state would be on the marshy border of some oasis in the desert, or near such a place as Busreh, where the ground would be watered by a tidal river. Hereabouts a wild date would be a greater curiosity than a wild camel; for it could not possibly exist with the scanty rain that falls. The natives, although they understand pruning and grafting, are careless in their cultivation of fruit-trees generally. They never touch the apple, pear, mulberry, or apricot, but let them grow on, only giving them water. The Date-tree, on the other hand they have made quite a study. I shall give as concisely as I can the information I have gathered on this subject; for I am surprised to observe that even in the north of India, where experiments on the Date are carried on, more correct knowledge as to its cultivation would appear to be required. In this province the Date-tree is never grown from seed. Occasionally, it is true, a Date-tree will be pointed out that has sprung from a chance seed and suffered to live; but this is a rare curiosity. Till it is one year old it is impossible to tell whether it is male or female; and should it be recognized as female by the leaf, a still longer time

must elapse before it bears fruit. As a rule, it may be expected to be worthless, although now and then a good variety has been produced in this way. It is of no use selecting seed for sowing; for no one making a date-grove would ever plant a seedling, but would always take an offshoot. These offshoots spring from the parent tree at the junction of the root and the stem. The parent, itself originally an offshoot, throws out its suckers, one to five in number, but sometimes as many as twenty, from the second year of its independent existence to the time of its bearing fruit. The tree throws out these suckers only at one period of its life; and should it bear fruit before any have appeared, it never has any at all. If the ground is good, the offshoot may be torn from the tree at two years; but should it be poor, the shoot must be left attached a year longer. The shoot is a hardy thing, and may be thrown aside for a month after detachment; nay, I have seen some that were partially burned, and have been told that they were still good for planting, and were sure to grow. The shoot is planted in a hole 1 foot deep and the same in width; and care must be taken not to water it more than once in three or four days, else the young roots will rot. During the winter it must be protected from the frost by a piece of matting, often for two years; and the earth must also be raked from the root and horse-dung put in. At five years the tree produces fruit; but it does not reach perfect bearing until it is ten years old. The Date-tree lives from a hundred to a hundred and fifty years; and it is said that some are now in existence two hundred years old, though they do not produce one eighth of the fruit they bore in their prime. Two male trees are considered sufficient for one hundred females. Impregnation is performed artificially; but great care must be taken to give the dark varieties only a very slight sprinkling of pollen; and although the light varieties require a little more, that must be sparing also; else the dates will drop off before ripening.

The young trees produce the most luscious fruit; but the date will not keep or bear packing and transport till the tree bearing it is ten years old. The offshoots are, of course, of the same sex and variety as the parent. The male trees are, so far as is known, all alike. No difference has ever been discovered in any part of them; and no change has ever been detected in the fruit of any one female, although the males are used indiscriminately for impregnation. There are about a hundred varieties of

the females, which can be discriminated not only by the fruit, but, many of them, by the leaf.

The best dates of all are grown at Il Hissah and Shitolah, oases in the desert, where fresh water gushes from the ground in abundance and spreads over the light soil of the desert with its dry burning winds. The next best are from Busreh, where the combined waters of the Euphrates and Tigris, shut up twice a day by the tides of the Persian gulf, overflow their banks and supply the trees with slightly brackish water. The soil in that neighbourhood is alluvial and saltish, and the air hot and moist. Although the Baghdadee sturdily maintains the excellence of his dates, there can be no doubt that they are not equal either in quality or quantity to those grown further south; and the most luscious varieties, those with smallest stones and presumably from the most delicate plants, are not found here in so large a proportion as elsewhere. Baghdad, indeed, in lat. 34° N., is within a degree of the most northern limit of the date. The variety Zadie produces the heaviest crops, averaging 300 lbs. weight to a tree. Each place has its different taste for dates. Baghdad prefers the Sukri and Khustawieh, which is the highest crop of all. Constantinople imports the Zadie packed in skins, and India the Khaderawie, Sair, and Brem in baskets. These are shipped at Busreh, and are varieties not liked here. I send specimens of twenty-six varieties of dates, with the names as follows:—

1. Zadie .... light.
2. Sukri .... „
3. Khaderawie .... „
4. Brem .... „
5. Khustawieh .... „
6. Drah Subbah .... „
7. Duglat el Hatoon .... „
8. Bedraieh .... „
9. Debœnieh .... „
10. Etchrisieh .... „
11. Duglah hilwah .... „
12. Burbum .... dark.
13. Saada humrah .... „
14. Dagal Shukur .... light.
15. Amamet el Kathie .... „
16. Tiberzel .... „

17.	Muktoom	light.
18.	Makawieh eshgar	dark.
19.	Brahamieh	„
20.	Asabieh el Aroos	light.
21.	Makawieh ahmur	dark.
22.	Sin Mufta	light.
23.	Dugal Badam	„
24.	El Washa	„
25.	Shagra	dark, light.
26.	Findukieh	„

Rhamnads.—It is difficult to say whether the Mabk (No. 109) is indigenous, though it looks like it from its size and vigorous growth (for it is by far the largest tree in this country, the trunk often measuring 3 feet in diameter), also from the way it sends down its roots, so as soon to become independent of surface-moisture. At present it is found only in the neighbourhood of gardens and cultivation. Away from such protection, in a country destitute of forest, it would not be allowed to reach maturity. It is remarkable in flowering twice a year—once in the end of July, when it produces fetid flowers and fruit ripening in September or October, which is full of worms and quite uneatable. It flowers again in February; but this time the flowers are scentless, the fruit, as big as a large filbert, ripens in April, when it is considered to be in perfection, though it has much the flavour of a wizened apple.

Tamarisks.—The tamarisk forms almost exclusively the brushwood that fringes the banks of the rivers and of the old canals. It is the chief source of charcoal and household fuel; but the reckless way in which it is cut down bids fair to exterminate it; for the charcoal-burners, not content with cutting down the wood, also dig up the roots. In this way destruction will go on till it is found, when perhaps too late, what an important service the tamarisk renders in binding the earth of the river-banks, which are generally above the level of the surrounding country. I have noticed in my shooting-excursions a great change during the last five years in the banks of both great rivers. There is now not a quarter of the brushwood there used to be; but as the tamarisk is a fast-growing tree, there is reason to think that with due superintendence and good management the supply might be kept equal to the demand. This tamarisk does not produce manna.

Drugs.—Although it has long been known that the gums and spices of old did not come from Arabia, still I was not prepared to find this part of the country yielding only two plants in any way used in medicine. One is the Caper bush. Of this, the young shoots and delicate leaves are made into a decoction; and this, leaves and shoots included, is taken as an aperient and anthelmintic. It is used, I believe, with good effect in cases of round worm. Of another plant (No. 108), the root and branches are burned, and the residue, a dark mass consisting chiefly of soda (potash ?), is called "kali," obviously the origin of our word alkali. It is used in medicine and also in soap-making.

I append a meteorological Table taken from a former (sanitary) report of mine.

(Signed) W. H. COLVILL.

Baghdad, 1st September, 1873.

General Idea of an average Season in Baghdad.

	Average maximum temperature.	Average minimum temperature.	Number of cloudy' days.	Number of days with rain.	Number of days with N.W. winds blowing.	Number of days with S.E. winds blowing.
January. For a few days in this month the thermometer in the veranda of the courtyard is down to 34°...	57°	45°	13	6	20	6
February	66	52	12	2	14	10
March..........	74	59	13	5	15	9
April	82	65	8	3	18	10
May	92	74	14	3	20	7
June	99	80	1	...	27	
July	103	85	...	...	31	
			61	19	145	42

	Average maximum temperature.	Average minimum temperature.	Number of cloudy days.	Number of days with rain.	Number of days with N.W. winds blowing.	Number of days with S.E. winds blowing.
Brought forward	...	...	61	19	145	42
August. Few days in middle of month thermometer 115°, a few days with banks of cloud at sunset	107°	88°	...	...	25	5
September	101	83	...	...	20	3
October. Sometimes a few drops of rain.	90	71	14	...	14	7
November	71	57	10	2	12	12
December	64	52	17	8	14	11
			102	29	230	80

Rainfall 18 to 25 inches in the year.

On *Hieracium silhetense*, DC.

By C. B. Clarke, Esq., F.L.S.

[Read May 7, 1874.]

In the "Notes on Compositæ" by Mr. Bentham in the Linnean Society's Journal of Botany, vol. xiii. p. 473, we read, "One species of *Ainsliæa* was originally described as a *Hieracium* (*H. silhetense*, DC.)."

And in the 'Genera Plantarum,' Bth. and Hk., vol. ii. p. 493, we read "*Hieracium silhetense*, DC. Prod. vii. 218, est *Ainsliæa angustifolia*, Hk. f. et Thoms."

In my paper on the Bengal Compositæ referred to in Mr. Bentham's "Notes on Compositæ" above quoted (p. 577), I entered *Hieracium silhetense*, DC., as good. I collected a plant in June 1868 scattered over the grassy hills of Khasia (formerly forming North Sylhet) at 4000–5000 feet elevation above the sea, which I at once identified as *Hieracium silhetense*, DC., from the description in the 'Prodromus.' Subsequently I compared my specimens with the bundle marked "*Hieracium silhetense*," DC., in the

Calcutta herbarium, and found the whole were the same species. Among the sheets in the Calcutta-herbarium bundle is one original sheet of Wallich's, numbered 3280, and also with a cross reference to the comp. n. 390, which numbers refer to the name *Prenanthes Candolleana*, Wall.; and on refering to the 'Prodromus,' *l. c.*, and to Fries in Walp. Ann. ii. p. 1006, it is seen that De Candolle and Fries both arrived at their *Hieracium silhetense* by taking up Wallich's *Prenanthes*? *Candolleana*. From the Calcutta-herbarium bundle it appears that the same plant was collected on the same ground as *Crepis* No. 5, by Hook. f. et Th., in Tenasserim as *Crepis* No. 3369 by Helfer, and in the East Himalaya as *Crepis* No. 3368 by Griffith. Mr. Kurz informs me he has seen it far down in Malaya.

The specific description of *Hieracium silhetense*, DC., fits this authentic specimen of *Prenanthes*? *Candolleana*, Wall., so accurately that I have little addition to make to it. In the following I have copied out De Candolle's words and italicized my own additions.

HIERACIUM SILHETENSE, *DC.* Glabrum *nisi involucrum basi glauco-puberulum,* radice crassa cylindracea, caulibus e collo plurimis sulcato-angulatis subnudis apice paniculato-corymbosis, foliis radicalibus *elongato-lanceolatis* utrinque acuminatis integerrimis *aut sæpe denticulatis,* caulinis paucis lineari-subulatis elongatis, involucro cylindraceo subcalyculato 10–25-*floro,* achæniis longitudinaliter striatis, *pappo sordide subfuscescente. Floret Maio, Jun.*

In this plant the florets are all ligulate, yellow, the achenes glabrous, the pappus scabrid and not plumose; and there can be no doubt that it is either a *Hieracium* or a *Crepis*. The specific description of De Candolle can in no wise be tortured to fit either of the Khasi Ainsliæas, which have about three florets to each head, the intricate elongate heads any thing rather than subcalyculate, and any thing but glabrous. I do not think it possible that Wallich can ever have marked either of these purple-flowered Ainsliæas as a *Hieracium* (as Mr. Bentham presumes) except by a mere slip of the pen. I subjoin specific descriptions of these two Ainsliæas, as I possess good series of complete specimens.

AINSLIÆA SILHETENSIS, i. e. *Ainsliæa pteropoda, β. silhetensis,* DC. vii. p. 14. Plus minus villosa ad collum hirsuto-lanuginosa. Folia radicalia petiolata, petiolo alato, lamina elliptica in petiolum subito an-

gustata. Folia caulina oblonga, sessilia, subtus albo-tomentosa. Capitula subtriflora fasciculata, sæpius secus rhachin paniculæ elongato-linearis subsessilia patula divergentia. Floret mensibus Oct.–Dec. ad 4000–5000 ped. alt.

This plant is very abundant throughout Khasiland on the open grassy hills. It differs from *Ainsliæa pteropoda*, DC., a Himalayan plant, by the more crowded inflorescence coupled with the stem-leaves (usually more numerous and much larger) white-tomentose beneath. It should probably be reckoned a geographical race only.

AINSLIÆA ANGUSTIFOLIA, *Hk. f. et Th. MSS.* **Plus minus villosa ad collum hirsuto-lanuginosa. Folia radicalia anguste lineari-obovata, rarissime petiolata, petiolo alato, lamina elliptica in petiolum subito angustata. Folia caulina pauca, nana, angusta, subtus haud albida. Capitula subtriflora, in paniculam oblongam elongatam laxiuscule disposita. Floret mensibus Oct.–Dec. ad 4000–6000 ped. alt.**

This species grows in quantity in wet shady spots under rocks at isolated localities in Khasiland. In the rare form in which the leaves appear with a winged petiole and a definitely separable limb, *A. angustifolia* hardly differs from *A. pteropoda*, DC., except by its smaller heads and achenes. The leaves generally are very narrow, obovate, quite uniformly narrowed; but even these leaves, if examined closely, will be found to have the venation exactly of the species with a separable winged petiole.

Returning to *Hieracium silhetense*, DC., the pappus in all the specimens here is "dirty;" Fries describes it as white. Most botanists who have collected it have referred it (apparently in the field) to *Crepis*. This is explained by its straggling habit with few leaves, and by its being quite (or all but) glabrous; but the achene and pappus are, to my idea, exactly those of *Hieracium*; and I think it may be very well left where De Candolle and Fries have placed it.

I have treated this question of the existence of a separate plant called *Hieracium silhetense*, DC., in considerable detail, because I judge that on even so small a point people will not readily believe that the President of the Linnean Society could have been mistaken. But I selected this question for a paper, not so much for the honour of making a correction on Mr. Bentham as to introduce a few remarks on authentic specimens.

Mr. Bentham says flatly that *Heracium silhetense*, DC., is

Ainsliæa angustifolia, Hk. f. et Th.; and from this I feel sure that Mr. Bentham has seen an authentic specimen of *Hieracium silhetense* (most probably a sheet of the Wallichian No. 3280, with the number written on in Wallich's own hand), and that this specimen so marked *is Ainsliæa angustifolia*. No one who has worked in the Calcutta Herbarium will underestimate the value of *authentic* specimens; but the point which I wish to bring out is that they do not *finally* decide the name of a species. I fear that I have at least once or twice issued specimens of species, described by myself, named wrongly in my own handwriting; and I am quite sure that Wallich has done this very many times. It could hardly be otherwise where plants are distributed on so large a scale that in many orders they were not worked, but merely sorted by hand and eye, before distribution. In a genus like *Cyperus*, which submits poorly to this treatment, there may be found often two species mixed under one Wallichian number and name. The present mistake about *Hieracium silhetense* is probably due merely to the naming a specimen "temporarily" in the field without books, possibly in a not over dry tent 7 feet by 6, and overlooking the mistake in setting out the duplicates for distribution.

On the Restiaceæ of Thunberg's Herbarium. By MAXWELL T. MASTERS, M.D., F.R.S., F.L.S.

[Read June 4, 1874.]

IN my former communications to the Society relating to the Restiaceæ of South Africa, I had occasion to allude to the difficulties sometimes experienced in the attempt to determine the species described by Thunberg. In the few cases where figures were given by him the representation is so perfect as to leave little to be desired; but the descriptions are so meagre that it often happens that the sex even of the plant is not mentioned.

Apart from such deficiencies, it is often no easy matter to determine the species of a Restiad. The species are often very similar one to the other, and present none, or but few, tangible discriminative characters. The male plants especially are remarkably uniform throughout the several genera; and it is a matter of difficulty, often of mere guesswork, to pair the sexual

forms. Under such circumstances, the difficulty of identifying the plants intended by the older writers is intensified. It was therefore with much interest that I was lately enabled to examine the Restiaceæ of Thunberg's herbarium, which had been obligingly forwarded to Kew for inspection and comparison. No previous writer that I am aware of has had a similar opportunity, unless it be in the case of isolated specimens which are to be found in some herbaria. Monographers have therefore had to guess at Thunberg's meaning. Each successive writer has either guessed for himself with greater or less probability, or has contented himself with citing the opinions of his predecessors. It may therefore not be entirely without interest to put on record the results of my examination of these specimens. It should, however, be stated that, beyond the rectification of the nomenclature in particular cases, there is not much that calls for comment.

A manuscript Flora Capensis by Thunberg is at the British Museum; and I owe the privilege of inspecting it to the Keeper of the Botanical Department. No date is attached to it; but as it comprises only eight species of Restiaceæ, it may probably be considered among the earliest of Thunberg's writings on the subject*.

In 1788 Thunberg published, in the form of an academical dissertation, twenty-six species of Restio; and these find a place in the author's 'Flora Capensis,' 1806. In the 'Flora Capensis' of the same author, edited in 1823 by J. A. Schultes, thirty species of *Restio*, three of *Willdenovia*, and one of *Elegia* are enumerated.

It is not necessary to do more than make passing allusion to the separate publications of Thunberg on the plants of this order, as the species therein described are all included in one or other of the more complete monographs already referred to.

* The species included are thus entitled:—

"Restio dichotomus, *Linn. Syst. Nat.* ed. 13.
Elegia juncea, *Linn. Mant.* i. p. 297.
E. digitata.
E. verticillata.
Thamnochortus, *Berg, Cap.* p. 353, tab. 5. fig. 2.
T. aphyllus.
T. aristatus."

No characters are given of any of these. It is doubtful to what species *T. aphyllus* belongs.

With one exception (*Elegia juncea*, L.) all the species mentioned by Thunberg are represented in his herbarium, though it is not in all cases quite certain that the names attached to the specimens are correct.

The name of the plant is written in Thunberg's handwriting on the face of each sheet, at the lower right-hand corner, the locality and collector's name on the reverse side at the upper left-hand corner. As will be seen, the majority of the specimens were collected by Thunberg himself, but some few by Masson. In the following enumeration I have first cited the name given in the herbarium, and have then appended to it the designation under which the plant is mentioned in my papers in the Journal of the Society, before referred to. I have endeavoured to comply with the laws of priority where reasonable certainty of identity exists; but where a plant has been placed in a new genus, I have then taken the modern combination of generic and specific names. For full details as to synonymy I may refer to my previous communications. Names that I consider should be henceforth adopted are printed in small capitals.

Enumeration of Species in Thunberg's Herbarium &c.

1. "RESTIO BIFIDUS, e cap. b. Spei, Masson." = *R. vaginatus* ♂, Mast. in Journ. Linn. Soc. viii. p. 250, haud Thunb.

Thunberg's description of his *R. bifidus* in his Fl. Capens. i. p. 87, is not sufficient to allow of satisfactory identification. In my enumeration of the species I followed the indications of my predecessors, and, as it now appears, was in error in so doing.

2. "*Restio aristatus* ♂, e cap. b. Spei, Thunberg." = HYPODISCUS ARISTATUS, *N. ab E.*, Mast. in Journ. Linn. Soc. x. p. 253.

3. "*Restio aristatus* ♀, e cap. b. Spei, Thunberg." = HYPODISCUS ALBO-ARISTATUS, Mast. *l. c.* x. p. 257.

4. "*Restio umbellatus* ♂ et ♀, e cap. b. Spei, Thunberg." = THAMNOCHORTUS CERNUUS, *Kunth*, Mast. *l. c.* x. p. 233.

Of this there are three specimens—two with male flowers, the third without any.

5. "*Restio umbellatus* ♂, β, e cap. b. Spei, Thunberg." = THAMNOCHORTUS IMBRICATUS ♂, Mast. *l. c.* x. p. 231.

6. "*Restio cernuus*, e cap. b. Spei, Thunberg." = THAMNOCHORTUS CERNUUS, *Kunth*, Mast. *l. c.* x. p. 233.

The discrimination of the male plants of *Thamnochortus umbellatus, imbricatus,* and *cernuus* one from another is by no means easy. *T. cernuus* may generally be known by its turbinate or roundish spikes, obovate bracts, and coarsely tubercled culms. *T. imbricatus* has larger spikes, subglobose in form, and oblong bracts; the tubercles on its culm are relatively inconspicuous. *T. umbellatus* has oblong, erect or pendulous spikes, oblong bracts and wrinkled culms. As the specimens in Thunberg's herbarium, under the name *T. umbellatus,* seem hardly to correspond with his description and figure given in his Diss. p. 11. n. 5, f. 3, it is prudent not to disturb the existing nomenclature and arrangement of synonyms.

7. "*Restio nutans* ♂, e cap. b. Spei, Thunberg." = THAMNOCHORTUS ELONGATUS, Mast. *l. c.* x. p. 227.

Nees had already assigned (in herb. Sonder.) Thunberg's *R. nutans* to *Thamnochortus elongatus.* The name *elongatus* has the priority over *nutans,* and should therefore be retained.

It may here be remarked that more than one species is probably comprised under *Thamnochortus elongatus*; but further specimens are required to determine the point with accuracy. The specimen in the herbarium does not correspond with Thunberg's description of *Restio nutans,* which is described as having "*spicis cylindricis cernuis.*"

8. "*Restio parviflorus* ♂, e cap. b. Spei, Thunberg." = CANNAMOIS SCIRPOIDES, Mast. *l. c.* x. p. 237.

9. "*Restio elongatus* ♀, e cap. b. Spei, Masson." = THAMNOCHORTUS ELONGATUS ♀, Mast. *l. c.* x. p. 226.

10. "*Restio vaginatus,* e cap. b. Spei, Thunberg." = THAMNOCHORTUS (§ Staberoha) IMBRICATUS, var. STENOPTERUS, ♀, Mast. *l. c.* x. p. 231.

Following preceding monographers, I had assigned (Journ. Linn. Soc. x. 250) Thunberg's *Restio vaginatus* to the plant which, according to the herbarium of that botanist, should have been called *Restio bifidus.* The names *vaginatus* and *imbricatus* are of the same date; but it will cause least confusion to adopt the latter.

11. "*Restio acuminatus* ♂, e cap. b. Spei, Thunberg." = CANNAMOIS SIMPLEX, *Kunth,* Mast. *l. c.* x. p. 237.

The herbarium specimens confirm the conjectures made by Nees and myself as to the synonymy of this species.

This is also referred to "*Chondropetalum nudum*, Rottb. Gram. p. ii. t. 3. f. 3, ♀."

12. "*Restio tectorum* β, e cap. b. Spei, Thunberg."=DOVEA TECTORUM ♂, Mast. *l. c.* x. p. 249.

13. "*Restio tectorum* γ, e cap. b. Spei, Thunberg."=DOVEA TECTORUM ♂, Mast. *l. c.* x. 249.

14. "*Restio tectorum* α, e cap. b. Spei, Thunberg."=DOVEA HOOKERIANA, Mast. *l. c.* x. p. 249.

So much confusion has existed as to which plant should rightly bear the name "*tectorum*," that it is satisfactory to find that the examination of the Linnean and Thunbergian collections does not necessitate material changes in the synonymy, though I have found it necessary to place the plant intended by Linnæus and Thunberg in a different genus.

15. "*Restio argenteus* ♂, e cap. b. Spei, Thunberg." = HYPODISCUS ARGENTEUS ♂, Mast. *l. c.* x. p. 261.

16. "*Restio triticeus* ♂, e cap. b. Spei, Thunberg."= R. PANNOSUS ♂, Mast. *l. c.* viii. p. 244.

This does not correspond with the *R. triticeus*, which is well figured by Rottboell, Descr. et Ic. p. 7, t. 3. f. 1, but rather with the species described by myself as *R. pannosus*.

17. "*Restio triflorus*, e capite bonæ Spei, Thunberg."=R. BIFIDUS ♂, Mast. *l. c.* viii. p. 253, nec Thunb.

There has been an erasure in this label; but it seems probable that the name may originally have been written *R. bifidus*. On the same sheet, in another handwriting, the plant is called *R. triflorus*, Rottb. Gram. p. 3, t. 2. f. 2. It does not, however, correspond well with the figure and description of Rottboell's *triflorus*.

18. "*Restio fruticosus*, e capite bonæ Spei, Thunberg," haud Thunb. Diss. n. p. 14,=LEPTOCARPUS MODESTUS, Mast. *l. c.* x. p. 225.

19. "*Restio scopa*, e cap. b. Spei, Thunberg."=CANNAMOIS VIRGATA, *Steud.*, Mast. *l. c.* x. p. 234, forma monstrosa.

20. "*Restio digitatus*, e cap. b. Spei, Thunberg."=HYPOLÆNA ECKLONIANA ♂, Mast. *l. c.* x. p. 263.

The description of *R. digitatus*, Thunb., does not correspond well with this plant, especially in the perianth.

21. "*Restio digitatus* β, e cap. b. Spei, Thunberg." = HYPOLÆNA ECKLONIANA, Mast. *l. c.* x. p. 263.

22. "*Restio triticeus* ♀, e cap. b. Spei, Thunberg."

On this sheet there are three specimens, two of which belong to *R. pannosus* ♀, Mast. Journ. Linn. Soc. viii. 244, and one ♂ to *Hypolæna impolita*, Mast. *l. c.* x. 264.

23. "*Restio glomeratus*, e cap. b. Spei, Thunberg." = WILLDENOVIÆ cujusdam forma monstrosa; vide Mast. *l. c.* x. p. 279.

24. "*Restio incurvatus*, e cap. b. Spei, Thunberg." = WILLDENOVIÆ cujusdam forma monstrosa.

25. "*Restio tetragonus* ♂, e cap. b. Spei, Thunberg." = R. TETRAGONUS ♂, *Thunb.*, Mast., *l. c.* viii. p. 245.

26. "*Restio tetragonus* β, e cap. b. Spei, Thunberg." = R. TETRAGONUS ♀, *Thunb.*, Mast. *l. c.* viii. p. 245.

27. "*Restio tetragonus* γ, e cap. b. Spei, Thunberg."

Of this there are two fragments, one a grass, the other is indeterminable.

28. "*Restio squamosus*, e cap. b. Spei, Masson."

This is not a Restiad, but perhaps a species of *Thesium*; but it is too imperfect to be determined. Thunberg's description of *R. squamosus* (Fl. Cap. i. 87), however, suits this plant very well, and renders it almost certain that *Elegia squamosa*, Mast. *l. c.* x., is not the plant which Thunberg intended for his *Restio squamosus*.

29. "*Restio cuspidatus*, e cap. b. Spei, Thunberg" (*Fl. Cap.* i. 87).

Of this there are two specimens: one is *R. Sprengelii* ♂, Mast. *l. c.* viii. 224; the other is *Hypodiscus Willdenovia* ♀, Mast. *l. c.* x. 259. Under my *R. Sprengelii* I had included *R. cuspidatus* as a doubtful synonym; and on the faith of this specimen I would now confirm this identification and suppress the name *Sprengelii*.

30. "*Restio verticillaris* ♂, e cap. b. Spei, Thunberg." = ELEGIA VERTICILLARIS, *Kunth*, Mast. *l. c.* x. p. 244.

31. "*Restio verticillaris* ♂, β, e cap. b. Spei, Thunberg." = ELEGIA VERTICILLARIS, Mast. *l. c.*

32. "*Restio verticillaris* ♀, α, e cap. b. Spei, Thunberg, in fossis Rode

Gand (?) infra Winterhoek." = ELEGIA VERTICILLARIS ♀, *Kunth, l. c.*

33. "*Restio verticillatus* ♀, *β*, e cap. b. Spei, Thunberg." = ELEGIA VERTICILLARIS, *Kunth*, Mast. ut supra.

34. "*Restio verticillatus* ♀, *γ*, e cap. b. Spei, Thunberg." = ELEGIA VERTICILLARIS, *ut supra*.

35. "*Restio virgatus* ♂, e cap. b. Spei, Thunberg." *Restio virgatus*, Rottb. Gram. = CANNAMOIS VIRGATA ♂, Mast. *l. c.* x. p. 234.

36. "*Restio paniculatus* ♂, e cap. b. Spei, Thunberg." = LEPTOCARPUS PANICULATUS, Mast. *l. c.* x. p. 221.

37. "*Restio erectus* ♂, e cap. b. Spei, Thunberg." = THAMNOCHORTUS ERECTUS, hic infra descripta.

The species called *Restio erectus* in Thunberg's herbarium is the male plant of a species of *Thamnochortus*, identical, as I believe, with one of the plants called by Nees (in herb. Sonder.) *Restio paleaceus*. Ecklon's no. 77 should be referred to the same species. In my previous paper (Journ. Linn. Soc. x. 227) I referred Ecklon's specimen to *Thamnochortus elongatus*, but, as I now believe, erroneously. The description of *Restio erectus* in the 'Flora Capensis,' p. 81. n. 12 (1823), is not sufficient to determine the plant; but, assuming that the specimen in his herbarium represents what Thunberg meant by *R. erectus*, it may now bear the name of *Thamnochortus erectus*, and be thus described:—

THAMNOCHORTUS ERECTUS, *Mast.* *Culmo* fertili simplici, tereti, olivaceo, obscure sulcato, squamis albidis minutissimis obtecto; *vaginis culmeis* 1⅔ poll. arctis, subcoriaceis, brunneis, striatis, apice lanceolatis laceris; *panicula* pluristachya, erecta; *spiculis masculis* 3–4 lin. longis, primo cylindratis, demum subturbinatis, rectis vel leviter curvatis, in catervas obpyramidatas congestis, singulis *spatha* vaginæformi, ipsa parum breviore munitis; *bracteis* ovato-oblongis obtusiusculis, mucronulatis, *flores* oblongos vix superantibus; *glumis* anguste oblongis, lateralibus externis vix alatis carinatis, carina glabra; *antheris* apiculatis. Femina mihi ignota.

It is not easy to express the differences between this and *T. elongatus* in words. The bracts and glumes of the present plant, however, are blunter, not so nearly lanceolate; and the spikelets are smaller.

38. "*Restio spicigerus* ♂, e cap. b. Spei, Thunberg." = THAMNOCHORTUS SPICIGERUS ♂, *R. Br.*, Mast. *l. c.* x. p. 228.

39. "*Restio spicigerus* ♀; e cap. b. Spei, Thunberg." = THAMNOCHORTUS SPICIGERUS ♀, Mast. *l. c.* x. p. 228.

40. "*Restio dichotomus* ♂, *a*, e cap. b. Spei, Thunberg." = R. TRITICEUS, *Rottb.*, Mast. *l. c.* viii. p. 243.

41. "*Restio dichotomus β*, e cap. b. Spei, Thunberg." = R. FERRUGINOSUS ♂, *Link*, Mast. *l. c.* viii. p. 226.

On the same sheet is written, in another handwriting probably, "*Schœnus capensis*, L., ut vidi ex herb. Solander."

42. "*Restio dichotomus γ*, e cap. b. Spei, Thunberg." = R. TRIFLORUS ♂, *Rottb.*, Mast. *l. c.* viii. p. 234.

It is thus clear that Thunberg's herbarium throws no definite light on what he meant by his *Restio dichotomus* (Diss. n. 26), which by subsequent writers has been assigned to many different plants. Linnæus's *R. dichotomus* I believe to be *Thamnochortus fruticosus*, Berg, in 'Journ. Linn. Soc.' viii. 212, x. 229.

43. "*Restio vimineus* e cap. b. Spei, Thunberg." = RESTIO PERPLEXUS, *Kunth*, Mast. *l. c.* viii. p. 253.

The plant does not correspond with Rottboell's very insufficient figure of *Restio vimineus*.

44. "*Restio vimineus β*, e cap. b. Spei, Thunberg." = R. CINCINNATUS, Mast. *l. c.* viii. p. 240.

On the same sheet, in the same handwriting, is written "*Restio dichotomus*, e cap. b. Sp., Thunb.;" but it does not correspond with Rottboell's figure of that species.

45. "*Restio scariosus* ♂ et ♀, e cap. b. Spei, Thunberg." = THAMNOCHORTUS ARGENTEUS, Mast. *l. c.* x. p. 227.

This scarcely accords with the description given by Thunberg of his *Restio scariosus* (Diss. n. 12).

46. "*Restio scariosus* ♂ *β*, e cap. b. Spei, Thunberg." = THAMNOCHORTUS ARGENTEUS, Mast. *l. c.*

47. "*Restio thamnochortus*, e cap. b. Spei, Thunberg" = THAMNOTUS DICHOTOMUS, *R. Br.*, Mast. *l. c.* x. p. 229.

On the same sheet, in the same handwriting, is written "*Restio dichotomus*, Rottb. Gram. t. 2. f. 1, ♂."

48. "*Restio thamnochortus* ♂ et ♀, e capite bonæ Spei, Thunberg." = THAMNOCHORTUS FRUTICOSUS, *Bergius*, Mast. *l. c.* x. p. 229.

This is the species on which Linnæus established his genus *Restio*.

49. "*Restio imbricatus* ♀, e cap. b. Spei, Thunberg." = THAMNOCHORTUS IMBRICATUS, Mast. *l. c.* x. p. 231.

50. "*Willdenovia teres* ♀, e cap. b. Spei, Thunberg." = WILLDENOVIA TERES, *Thunb. Act. Holm.* 1790, 27, t. 2. f. 2; Mast. *l. c.* x. p. 269.

51. "*Willdenovia striata* ♀, e cap. b. Spei, Thunberg." = WILLDENOVIA STRIATA ♀, *Thunb. l. c.* f. 10; Mast. *l. c.* x. p. 270.

52. "*Willdenovia compressa* ♀, β, e cap. b. Spei, Thunberg." =? WILLDENOVIA COMPRESSA, *Thunb. Act. Holm.* 1790, t. 2. f. 3.

This may be the true *Willdenovia compressa* of Thunberg, whose description, however, would apply, except as regards the stigmas, to *Cannamois virgata*, Steud., as well as to a species of *Willdenovia*. Indeed the specimen has all the appearance of being a young state of *Cannamois*. The specimen, however, does not admit of examination. In both genera the presence of three stigmas, as described and figured by Thunberg, is unusual.

Observations on the Fruit of *Nitophyllum versicolor*. By Mrs. MERRIFIELD.

[Read May 7, 1874.]

OF the British species of *Nitophyllum*, the fruit of all, with the exception of that of *N. versicolor*, is well known. But although this species was discovered so long ago as the year 1800, the fructification was unknown to algologists until 1872 or 1873, when I received from a friend, who kindly divided her only specimen with me, a frond of this plant in fruit. Some time ago I sent a fragment, with fruit, of my plant to Prof. Agardh; but I have not yet heard his opinion of it. The fruit being unknown in this country, a brief description of it, accompanied by drawings, may perhaps be acceptable.

The specimen bears coccidia, which are very minute, and are scattered over the lamina of the frond. In size, the coccidium is about equal to four of the polygonal cells of which the surface is composed. The frond is pale in colour; the fruit appears

to be fully ripe—so much so that many of the coccidia were empty.

I could not succeed in cutting a section of a coccidium; but when pressed between two pieces of glass, I could distinguish that the spore-threads were much branched dichotomously, with wide axils, and appeared to be arranged in tufts.

Although in some of the English species of *Nitophyllum*, as in *N. punctatum* and *N. laceratum*, the spore-threads are very slightly

Fig. 1.

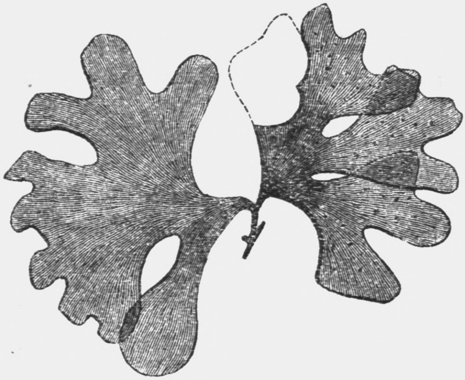


Fig. 2.

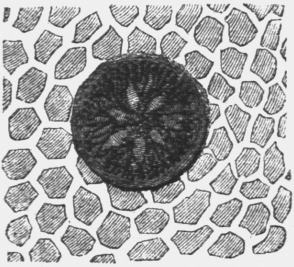


Fig. 3.

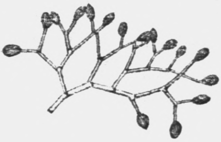


Fig. 1. Fronds of *Nitophyllum versicolor*, one of them with coccidia. Natural size. The dotted line shows where the frond has been cut.

Fig. 2. A coccidium, magnified. Appearance when compressed between two pieces of glass.

Fig. 3. A group of spore-threads with spores in single series.

branched, none are so much so as those of *N. versicolor*. In this respect it is nearer to the Australian species *N. Curdianum* (Phyc. Austr. pl. 151), in which, however, the spore-threads are more erect and less branched, and the spores are in a chain of two or three on each spore-thread; whereas in *N. versicolor* I did not see more than one spore on each thread.

It will be observed that in this fruitful specimen the *calli* usually found at the apices of the frond are entirely absent.

The plant was found at Ilfracombe, in July, some years ago, but was not identified as *N. versicolor*.

As the fruit was over ripe in July, it would be desirable to search for fruitful specimens in the latter part of June and beginning of July, when perhaps some algologist may be fortunate enough to find other specimens, and, not improbably, some bearing tetraspores.

It should be mentioned that the drawing was made from a dried specimen; hence its extreme flatness.

Notes on Indian Gentianaceæ.

By C. B. Clarke, M.A., F.L.S.

[Read May 7, 1874.]

The present notes contain a list of the Indian Gentianaceæ, with remarks on those species (*i. e.* especially the Bengal species) of which I have enough material to justify any. The list is reduced by the standard of Grisebach in DC. vol. ix.; and I have referred very little to any previous authors except Roxburgh, Wallich, and Wight. The materials I have had to work with have been:—

1st. My own herbarium, containing only Bengal (with some peninsular) species, but numerous duplicates.

2nd. The private herbarium of Mr. Kurz, containing numerous species from various parts of India, but few duplicates, and containing especially the Malayan species.

3rd. And chiefly the Gentianaceæ of the Calcutta Botanic-Garden collection, which have been placed at my disposal by the kindness of Dr. King, the Superintendent.

I am not merely indebted to Mr. Kurz for the loan of his pri-

vate herbarium; but I get the Calcutta Botanic-Garden herbarium Gentianaceæ after they have passed through his hands, and have been provisionally arranged by him.

The following notes are in all cases drawn up from specimens before me, except when I mark the species as "mihi ignota." I only cite authorities for the rarer species or rarer localities.

EXACUM, *L. in DC.* ix. p. 44.

Corolla speciosa.	Sect. A.	Flores 4-meri.
	Sect. B.	Flores 5-meri.
Corolla minor ...	Sect. C.	Flores 4-meri.
	Sect. D.	Flores 5-meri.

Sect. A. *Corolla speciosa. Flores 4-meri. Caules omnium (nisi* Exaci teretis) *tetragoni.*

1. EXACUM TERES, *Roxb. Flor. Ind.* i. p. 412 (ed. *Wallich*); *DC.* ix. p. 44.

In collibus Khasi ad 2000–4000 ped. alt.; in Sikkim ad 2000–3000 ped. alt., sat communis. In Nepal, *Wallich.*

Ab omnibus speciebus vicinis caule tereti distinguitur. Caulis autem sæpe 4-lineolatus aut obscure 4-angularis exstat.

β. Forma minor, cyma depauperata, foliis sub-1-nerviis angustis recurvato-patulis.

In collibus Khasi ad 4000 ped. alt., et in Sikkim ad 3000 ped. alt.; in solo calcareo.

2. E. TETRAGONUM, *Roxb. Flor. Ind.* i. p. 412 (ed. *Wallich*); *DC.* ix. p. 44.

In omni Bengalia frequens. In collibus Khasi usque ad 5000 ped. alt. In Himalaya a Bhotan ad Kemaoon ad 7000 ped. alt. ascendens. In Malabar, *Stocks.*

Corollæ diameter 1½-uncialis, in *DC.* errore typogr. 1½ lin. Calycis segmenta dorso 3- aut 1-alata, ala semilanceolata, apice subulato-acuminato. Antheræ 3–4½ millim., rectæ (vel vix curvatæ). Alabastra vix curvata. Cyma densa. Folia aliquando connata.

Var. *β.* KHASIANUM. Foliis ellipticis obtusis valde remotis; cyma depauperata.

In collibus Khasi ad 5000 ped. alt.

In exemplis montanis Bengalensibus *E. tetragoni* corollæ segmenta quam tubus 2–3½plo sæpe longiora videntur. E. Perrottetii, *Griseb.* (*in DC.* ix. p. 45; *Wight, Icones,* t. 1322), montium Nilgherries incola, ex descriptionibus et tabula nota differt nulla. Sed hujus speciei uni-

cum exemplum a Madras, sub nomine *Exaco Perrottetii* communicatum, est *E. Wightianum*, Arnott.

3. E. HORSFIELDIANUM? *cf. Miq. Flor. Ind.* ii. p. 556.

Omnia exempla sub hoc nomine a Java nuper communicata sunt. *E. sulcatum* infra.

Sed duo fragmenta a Horsfield lecta bonam constituunt speciem cujus descriptio sequitur:—

Folia superiora caulina late ovata, sessilia, 5-nervia. Sepala acuta neque acuminata, carinata, vix alulata. Corollæ diameter 1½-pollicaris, segmenta 4 obovato-elliptica acuta. Antheræ 6–7 millim., paullo curvatæ.

Inter omnes varietates *Exaci tetragoni* egomet nunquam vidi sepala exalata, antheras 5 millim. excedentes, folia juxta basin late ovata.

Quoad descriptionem *Exaci Horsfieldiani* a Miquelio *l. c.* elaboratam, partim ab hac specie, partim ab exemplis *E. sulcati* composita fuisse videtur.

An huc referendum *E. chironioides*, Griseb. in DC. ix. p. 45?

4. E. BICOLOR, *Roxb. in Flor. Ind.* i. p. 412 (ed. *Wallich*); *DC.* ix. p. 45; *Wight, Icones*, t. 1321.

In Cuttack, *Roxb.*; Peninsula, *Wight*; Malabar, *Stocks*; Bombay, *Dr. Gibson.*

Calycis alæ semiovato-lanceolatæ. Cyma sæpe magna. Internodia media foliis sæpe multo longiora.

Corolla in fundo lutescens, ad mediam partem fere albida, apice cærulea. Antheræ 9–12 millim., conspicue (ut sunt alabastra) curvatæ.

A vicinis speciebus in herbario ope antherarum distinguenda.

An huc referendum *E. grandiflorum*, Wallich in DC. ix. p. 47?

5. E. SULCATUM, *Roxb. Flor. Ind.* i. p. 415 (ed. *Wallich*); *DC.* ix. p. 45; *Miq. Flor. Ind.* ii. p. 556.—E. tricolor, *Zoll. et Moritz.*—E. stylosum, *Wallich in DC.* ix. p. 46.

In Bengalia, *Roxb.*; Circars, *Dr. Cleghorn.* A Burma, Sumatra et Java exempla numerosa recepta sunt. In Bengalia mihi nunquam obvia.

Corollæ diameter uncialis, in DC. errore typogr. 1 lin. Cyma sæpe multiflora elongata. Stylus longissimus. Folia sæpius lineari-lanceolata acuta, basi angustata nec petiolata: sed in ipsissimis exemplis folia latiora apice obtusiora basi subpetiolata videntur.

E. stylosum, Wallich, no. 4355, differt (?) foliis membranaceis omnibus latioribus apice obtusis basi quasi petiolatis. Pro me vix varietas, sed exemplum in loco umbroso lectum.

E. RIVULARE, *Edgw. in Walp. Ann.* v. p. 510, species hujus sectionis a Banda, Punjab, mihi ignota, remanet dubia.

Sect. B. *Corolla speciosa. Flores 5-meri. Caules* omnium (nisi forte *E. Beddomei*) tetragoni.

Species omnes Peninsulares aut Zeylanicæ et (*E. Beddomei* excepto) nimis approximatæ.

6. E. Wightianum, *Arn. in DC.* ix. p. 45; *Wight, Icones*, t. 840.

In Peninsula ad 4000–7000 ped. alt.

Cyma densa, foliosa, multiflora, ramis sæpe tetrapteris. Antheræ 4–5 millim., demum rimis apertæ, papilla extus instructæ.

7. E. foliosum, *Grisebach in DC.* ix. p. 45, "in India orientali," mihi ignota.

Ex descriptione vix a præcedente diversum.

8. E. courtallense, *Arn. in DC.* ix. p. 47.

Folia approximata, subviscide membranaceo-lucida, margine hyalino. Cyma foliosa, pauciflora, floribus sparsis sæpe subsolitariis. Corollæ diameter vix pollicaris. Antheræ 2–3 millim., poris apertæ, haud papilliferæ.

In Peninsula ad Courtallum *ex Wight*.

9. E. zeylanicum, *Roxb. Flor. Ind.* i. p. 414 (ed. *Wallich*); *DC.* ix. p. 45.—Chironia trinervis, *L.*

In Zeylania.

Folia sessilia aut breviter petiolata. Antheræ 6–9 millim., haud papilliferæ.

10. E. Walkeri, *Arnott in DC.* ix. p. 45.

In Zeylania, in montibus.

Corolla 1–1½-pollicaris. Antheræ 3–4 millim.

11. E. macranthum, *Arn. in DC.* ix. p. 46.

In Zeylania.

Caulis tetragonus aut subteres. Calycis alæ semiovato-lanceolatæ aut semilanceolatæ. Antheræ 9–12 millim.

Species vix ab *E. zeylanico* diversa: flores et antheræ sæpe sed non semper quam *E. zeylanici* majores. Alæ calycis basi sæpe semiovatæ sed vix (ut in *E. zeylanico*) semicordatæ.

12. E. ovale, *Grisebach in DC.* ix. p. 46.—E. axillare, *Thwaites, C. P.* no. 2998.

In Zeylania.

Cl. Thwaites hanc speciem ad varietatem *E. zeylanici* reduxit. Exempla autem a Thwaites communicata mihi videntur (antheris brevibus, foliis sæpe late ovatis 5-nerviis subpetiolatis) ad *E. Walkeri* pertinere. In ipsis exemplis a Thwaites communicatis, ab inferiore dichotomia pe-

dunculus solitarius uniflorus exstat. Cum quibus exemplis *E. axillare*, Thwaites, C. P. no. 2998, congruit, pedunculis solitariis unifloris pluribus additis.

13. E. BEDDOMEI, n. sp. No. 49, *Beddome*.

Caulis subteres. Folia approximata, elliptico-rotunda, brevissime acuta, 5–7-nervia, sessilia, marginata. Flos terminalis, solitarius, in diam. 2½–3 pollic. Petala 5, obovato-lanceolata. Sepala (pro ratione floris minima) ovato-lanceolata, dorso anguste alata.

In collibus Pulney, *Beddome*.

An flores semper solitarii? Species eximia flore magno foliisque ab omnibus remota.

Sect. C. *Corolla minor. Flores 4-meri.*

14. E. PUMILUM, *Grisebach in DC.* ix. p. 46; *Wight, Icones*, t. 1324.

In Malabar, *Stocks*. In Bombay, *Dr. Gibson*.

Calycis segmenta dorso ala semilanceolata munita, neque (ut in DC.) exalata. Cymæ pedicelli ultimi elongati divaricato-patuli ideoque flores sparsi. Caulis (ut in DC.) simpliciusculus, aut evolutior ramosissimus, dein pedicellis gracilibus divaricatis ab eo *E. pedunculati* distinguendus.

15. E. PEDUNCULATUM, *L. in DC.* ix. p. 46.—E. pedunculare, *Wight, Icones*, t. 336.—E. carinatum, *Roxb. Flor. Ind.* i. p. 415 (ed. *Wallich*).

Ad Calcutta et Sanebgunje, *Kurz*. In Chutia, Nagpore, ad 1000 ped. alt. tempore vernali florens. In Peninsula et Malabar, Behar, *Hook. f. et Th.* Oude, India bor.-occident., *Royle*.

[*E. pedunculatum*, Thwaites in C. P. 1876 (ex speciminibus a Thwaites ad T. Thomson et S. Kurz communicatis) est *E. petiolare*, Grisebach.]

Calycis segmenta dorso ala semilanceolata munita. Pedicelli ultimi rigidi strictiusculi, dein flores approximati. Flores lutei (*Kurz*): in plantis recentibus semper azureis vidi.

A speciminibus evolutioribus *E. pumili* differt floribus capsulisque majoribus, pedicellis erectis.

16. E. PETIOLARE, *Griseb. in DC.* ix. p. 46; *Wight, Icones*, t. 1324.

In Zeylania; Peninsula; Malabar. In omni Chutia, Nagpore, ad 1000–3000 ped. alt., tempore autumnali florens.

Corolla azurea aut alba.

Differt omnino ab *E. pterantho*, Wallich, floribus 4-meris; ab *E. pedunculato* foliis petiolatis, calycis alis basi latioribus cordatis.

17. E. SESSILE, *L. in DC.* ix. p. 47; *Wight, Icones*, t. 1324.

In Zeylania. In Belgaum (Bombay).

Calycis segmenta dorso subtrinervia exalata.

Sect. D. *Corolla minor. Flores 5-meri.*

18. E. PTERANTHUM, *Wallich in DC.* ix. p. 47.

In Tavoy, *Wallich.* In Burmah (*Kurz*) ad 3000–4000 ped. alt.

Calycis alæ cordato-ovatæ acutæ lucido-venulosæ. Flores in cyma tenui subsparsi.

Specimina a Kurz collecta sunt valde pusilla.

SEBÆA, *R. Br. in DC.* ix. p. 52.

SEBÆA KHASIANA, nov. sp.

Caulis strictus, tenuis, 2–6-uncialis: cyma stricta pauciflora. Folia ima mox evanida, caulina lineari-subulata vix semipollicaria. Calyx 5-partitus, sepalis lanceolatis acutis dorso carinatis aut tenuiter alatis. Corolla flava. Stylus persistens. Stigma capitatum. Capsula et semina generis.

In saxo Kollong, Khasiæ ad 5500 ped. alt.: mense Octobri florens.

ERYTHRÆA, *Pers. in DC.* ix. p. 57.

1. ERYTHRÆA RAMOSISSIMA, *Pers.*

Caulis humilis aut mediocris, simplex aut a basi ramosus, erectus aut basi decumbens. Folia ima rosulata, obovato-oblonga, sessilia aut mox deficientia. Folia caulina sessilia, oblonga vel latiora, 3-nervia. Cyma multoties dichotoma, floribus parvis roseis, lateralibus ebracteatis aut bibracteatis. Stigma bilamellatum.

α. Floribus fastigiatis, cyma densa.

In Peninsula.

β. PULCHELLA, *Fries,*=Erythræa Roxburghii, *Don in DC.* ix. p. 59; *Wight, Icones,* t. 1235.—Chironia centaurioides, *Roxb. Flor. Ind.* ii. p. 280 (ed. *Wallich*).

Floribus haud fastigiatis, cyma laxiore.

In omni Bengalia vulgaris. In omni India a Peninsula ad Himalayam.

γ. LINARIFOLIA? *Persoon.* Ad Lahore coll. Brandis, No. 2623. Cyma paniculata, foliis oblongis strictis.

2. E. ——?

Caulis humilis aut mediocris, foliosus, simplex aut a basi ramosus, ramis superne elongatis vix dichotomis paucifloris. Folia caulina ovato-oblonga, sessilia, 3-nervia, membranacea. Flores rosei, quam *E. ramosissimæ* majores: inferiores axillares subsolitarii pedicellati.

In Punjab, *T. Thomson*; Peshawur, *Stewart*; Umritsir, *T. Anderson.*

An=Erythræa diffusa, *Woods in DC.* ix. p. 59.

3. E. SPICATA, *Pers. in DC.* ix. p. 60.

Ad Peshawur, *Stewart.* Etiam in coll. Falconer verisimiliter ex Punjab. In Affghanistan, Persia, Europa australi.

ORTHOSTEMON, *R. Br. in DC.* ix. p. 63.

ORTHOSTEMON HUGELII, *Griseb. in DC.* ix. p. 63. "In India orientali." Mihi ignotus.

PLADERA, *Roxb. in DC.* ix. p. 63 (char. emendato si *P. fastigiatam* includere velis).

1. PLADERA PUSILLA, *Roxb. Flor. Ind.* i. p. 419 (ed. *Wallich*); *DC.* ix. p. 63; *Miq. Flor. Ind.* ii. p. 557.

Corollæ tubus campanulato-ventricosus, segmentis brevibus in fructu incurvatis intra calycem inclusis.

In Bengalia frequens. A peninsula ad Punjab.

2. P.? FASTIGIATA, *i. e.* Cicendia fastigiata, *Griseb. in DC.* ix. p. 62.

Corollæ tubus elongatus, segmentis oblongis in fructu erectis e calyce longe exsertis.

In Zeylania. In herb. Wight. no. 1825, cum *Pladera pusilla* commixta.

Corolla *Cicendiæ*, stamina omnino *Pladeræ*: videlicet stamen unicum perfectum, tribus parvis abortivis (aliquando fere obsoletis) additis. Species quoad habitum foliaque cum *Pladera pusilla*, Roxb., optime militans, corolla capsulaque elongatis facile distinguenda.

CANSCORA, *Lam. in DC.* ix. p. 64.

A. Caulis superne dichotomus. Folia floralia imperfoliata.
B. Caulis superne dichotomus. Folia floralia perfoliata.
C. Caulis basi ramosus, ramis superne elongatis subsimplicibus.

A. *Caulis superne dichotomus. Folia floralia (bracteæ) imperfoliata.*

Calyx 12-striatus, haud alatus. Rami cymæ vix tetrapteri. *C. diffusa, decurrens, Lawii.*

Calyx vix alatus. Rami cymæ tetrapteri. *C. sessiliflora.*

Calyx conspicue alatus.................. *C. decussata, macrocalyx.*

1. CANSCORA DIFFUSA, *R. Br. in DC.* ix. p. 64; *Miq. Flor. Ind.* ii. p. 558.—P. virgata, *Roxb. Flor. Ind.* i. p. 417 (ed. *Wallich*).

Folia inferiora lanceolata, subpetiolata. Rami cymæ ultimi capillares flexuosi. Bracteæ (saltem inferiores) foliaceæ, magnæ, late ovatæ acutæ.

α. Folia (et præcipue bracteæ) lucide membranulosa subviscida. Bracteæ omnes ovatæ, conspicuæ.

In Chittagong et Burmah vulgaris. In Malaya. In Bengalia occidentali et Peninsula ad 2000–3000 ped. alt.

β. TENELLA, *Wight, Icones*, t. 1327. Folia cum bracteis herbacea viridia. Bracteæ ovatæ, conspicuæ aut e superioribus quædam lineares minutæ.

A Calcutta ad Punjab et peninsulam, *i. e.* in omni India nisi Bengalia orientali obvia.

2. C. DECURRENS, *Dalz. in Walp. Ann.* iii. p. 79.—An C. tenella, *Wallich*, partim?

Folia inferiora lanceolata. Cymæ rami ultimi recti elongati. Bracteæ omnes (aut fere omnes) lineares, abbreviatæ, minutæ.

In Peninsula et Malabar.

α. Ramosissima, cyma multiflora densiuscula, bracteæ omnes lineares. Forsan ad *C. diffusam β. tenellam* supra referenda.

β. Valde elongata, cyma laxa, bracteæ infimæ ovatæ.

3. C. LAWII, *Wight, Icones*, t. 1327.—C. pauciflora, *Dalz. in Walp. Ann.* iii. p. 79.

Folia inferiora suborbiculata. Cymæ rami ultimi recti, elongati, sub calycibus incrassati subtetragoni.

In Malabar, *coll. Stocks*.

[Forsan *C. Lawii* et *C. decurrens* melius pro varietatibus *Canscoræ diffusæ* habendæ.]

4. C. SESSILIFLORA, *Rœm. et Sch. in DC.* ix. p. 64.—Pladera sessiliflora, *Roxb. Flor. Ind.* i. p. 416 (ed. *Wallich*).

Cymæ rami tetrapteri. Calyx vix alatus. Flores centrales sessiles.

In Zeylania, Peninsula, Malabar.

5. C. DECUSSATA, *Rœm. et Sch. in DC.* ix. p. 64.—Pladera decussata, *Roxb. Flor. Ind.* i. p. 418.—Canscora diffusa, *C. P.* no. 2841, ex speciminibus a cl. Thwaites communicatis.

In omni Bengalia vulgaris. In Zeylania, Peninsula, et Birma. In Himalaya occidentali.

Calycis alæ semilanceolatæ sæpe obscuræ: dein cymæ ramis alatis ab omnibus varietatibus *C. diffusæ* bene distinctæ.

6. C. MACROCALYX, *Miq. Flor. Ind.* ii. p. 558.

Caulis cum ramis cymæ tetrapterus. Folia ovata. Flores centrales breviter pedicellati. Calycis alæ semiovatæ, venosæ.

In Java, *coll. Horsfield*.

B. *Caulis superne dichotomus. Folia floralia (bracteæ) perfoliata.*

7. C. ALATA, *Wallich in DC.* ix. p. 65.—C. grandiflora, *Wight, Icones*, t. 1326.

Flores pro genere magni.

In Peninsula et Malabar.

8. C. PERFOLIATA, *Lam. in DC.* ix. p. 65; *Wight, Icones.* t. 1327.—Pladera perfoliata, *Roxb. Flor. Ind.* i. p. 418 (ed. *Wallich*).

In Zeylania, Peninsula, et Malabar.

C. *Caulis basi ramosus, ramis foliosis superne elongatis subsimplicibus. Flores in cymis abbreviatis paucifloris* (*vulgo* 1–3-*floris*) *pseudo-axillares.*

9. C. ANDROGRAPHIOIDES, *Griffith in Notulis.*

Caulis tetragonus, a basi divaricato-ramosus. Folia elliptico-lanceolata, trinervia, subpetiolata. Rami superne elongati subsimplices, ramulis floriferis axillaribus abbreviatis 1-floris vel cymosim 3–6-floris. Calyx 12-striatus, haud alatus, dentibus brevibus linearibus. Stigma breviter bifidum.

In Khasiæ collibus ad 1000–3000 ped. altit. frequens. Nomen speciei optimum: planta viva facillime pro *Andrographide* prætervideri potest.

HETEROCANSCORA, nov. gen.

(Sect. *Canscoreæ*, in DC. ix. p. 65).

Flores in spicis oppositi, singuli bractea externa bracteolisque geminis lateralibus majusculis stipati. *Calyx* tenerrimus. Corolla, stamina et stigmata *Canscoræ*. *Stylus* bilamellatus aut vix bifidus.

Genus habitu bracteis et inflorescentia *Acanthaceas* magnopere simulans, sed flores omnino *Canscoræ*.

1. HETEROCANSCORA SCHULTESII, *i. e.* Canscora Schultesii, *Wallich in DC.* ix. p. 65, = Pladera pulchella, *Wallich, Cat.* no. 4368.

Folia ima obovato-elliptica, subrosulata. Rami a basi plures, ramosi, tetrapteri, subnudi, nempe foliis caulinis lanceolato-linearibus minutis. Spicæ elongatæ, simplices, bracteis magnis ovatis acutis subimbricatis. Bracteolæ ellipticæ acutæ, dorso scabridæ, quam bractea paullo minores. Calyx angustus, 4-angulatus, dentibus linearibus, in angulis dentibusque scabridus. Corollæ tubus angustus.

In collibus Prome Burmæ, *Wallich*. In Yomah Burmæ, *Kurz*.

PHYLLOCYCLUS, *Kurz.*

Calyx urceolatus, teres, inæqualiter 4-dentatus. *Corolla* subæqualiter 4-lobata. *Stamina* 4, quorum 2 majora filamentis longio-

ribus. *Ovarium* et *capsula Canscoræ.—Herbæ glabræ, eretæ, dichotomæ. Folia perfoliata, suborbiculata. Flores albidi, in brevissimis pedicellis axillaribus solitarii.*

Canscora differt corolla subtrilobata lobo uno majore altius bifido, stamine uno majore, calyce alato aut anguloso.

1. PHYLLOCYCLUS PARISHII, *i. e.* Canscora Parishii, *Hook. in Hook. Bot. Mag.* t. 5429.

Calyx ventricoso-campanulatus c. semiuncialis. Flores albidi oculo luteo. Stamina 4, quorum 2 majora.

In Tenasserim et Moulmein Burmæ, *Kurz, Parish, T. Lobb.* In saxis calcareis et in muris templorum, *Kurz.*

2. P. HELFERI, *i. e.* Canscora Helferiana, *Wallich, MS.*

Calyx campanulatus c. 3 lineas longus. Flores viridescenti-albidi. Stamina 4, quorum 2 paullo majora.

In Tenasserim, *Helfer*, No. 5816.

I owe the account of this genus entirely to Mr. Kurz, who has placed at my disposal his manuscript of Gentianaceæ as prepared for the 'Handbook of the Burmese Flora,' which Mr. Kurz has in a forward state of preparation.

The genus is good enough. I see very little difference between the two species, so far as I can judge from the dried specimens. They are certainly very closely allied indeed.

SLEVOGTIA, *Reich. in DC.* ix. p. 65.

SLEVOGTIA ORIENTALIS, *Griseb. in DC.* ix. p. 65.—Adenesma hyssopifolium, *Don, Wight, Icones*, t. 600.—Gentiana verticillata, *Roxb. Flor. Ind.* ii. p. 71.—Hippion littorale, *Miq. Flor. Ind.* ii. p. 559.—Enicostema littorale, *Bl. in DC.* ix. p. 66.

A Zeylania ad Himalayam sed in Bengalia et Birma ignota. In Malaya. In Nubia ex *Grisebach.*

S. MARITIMA, *Dalz. Walp. Ann.* iii. p. 80, in Malabaria indigena, ex descriptione vix differt: mihi ignota.

GENTIANA, *Tournef. in DC.* ix. p. 86.

Pleurogyne differt corolla fere ad basin divisa.

Jæschkea differt staminibus ad apicem tubi corollæ insertis, seminibus magnis.

Clavis quoad species Indicas elaboratus :—

Flores minores, vix unciales ; seminis testa adpressa, fusca.
Amarella. Corolla plicis destituta.
Chondrophyllum. Corolla plicis aucta.
Flores majores, saltem unciales ; seminis testa laxa, albida.
Crossopetalum. Corolla fimbriata, plicis destituta.
Eurythalia. Corolla fimbriata, et plicis aucta.
Pneumonanthe. Corolla fimbriis destituta.
Flores majores, saltem unciales ; seminis falcati complanati testa adpressa...... *Kurroo.*

Sect. AMARELLA. ***Corolla plicis destituta. Capsula breviuscule stipitata aut subsessilis, intra corollam omnino aut fere inclusa. Seminis testa adpressa, fusca. Herbæ erectæ, caulescentes, ramosæ. Folia tenuiter herbacea. Corollæ minores, vix unciales.***

1. **GENTIANA MOORCROFTIANA,** ***Wallich in DC.*** ix. p. 96.

Caulis erectus, a basi ramosus. Folia anguste spathulato-oblonga, sessilia. Cymæ racemiformes, sæpe multifloræ. Pedicelli ½–2-unciales. Calyx fere ad basin 5-divisus, segmentis anguste oblongis corollæ tubo brevioribus. Corolla imberbis, c. uncialis, tubo sensim ampliato, lobis oblongis obtusis. Capsula oblonga, stipitata fere intra corollam inclusa. Semina ellipsoidea, pro genere majuscula.

In Himalaya occidentali et Ladakh ad 10,000–17,000 ped. alt.

2. **G. FALCONERI, nov. sp.**

Caulis erectus, a basi ramosus. Folia spathulato-oblonga, sessilia. Cymæ racemiformes, sæpe multifloræ. Pedicelli ½–2-unciales. Calyx ad ⅓–½ partem 4-fidus, segmentis ovatis aut lanceolatis corollæ tubo brevioribus. Corolla imberbis, c. uncialis, tubo sensim ampliato, lobis ellipticis. Capsula anguste oblonga, stipitata, fere intra corollam inclusa. Semina ellipsoidea, quam in G. *Moorcroftiana* multo minora.

In coll. Falconer. Prope Puddum Himalayæ boreali-occidentalis ad 12,000 ped. alt., *coll. Stoliczka.*

Calycis segmenta valde brevia, late ovata, aut lanceolata fere linearia, sed in omnibus tubus elongatus. Habitus omnino *G. Moorcroftianæ*, sed calyce floribus 4-meris et seminibus differt.

3. **G. STOLICZKA, *in herb. Kurz.***

Caulis erectus, 4–12-pollicaris, subtetragonus, a basi ramosus. Folia ima subrosulata, obovata, oblonga, caulina ovalia obtusa sessilia. Flores ad apices ramulorum aggregati. Calyx fere ad basin 5-partitus, segmentis lanceolatis corollæ tubo brevioribus. Corolla c. semipollicaris, tubulosa, intus omnino nuda. Capsula oblonga, sessilis. Stylus sub-

nullus, stigmatibus brevissimis. Semina parva, ellipsoidea, testa adpressa.

In Himalaya boreali-occidentali ad 14,000 ped. alt., *coll. Stoliczka.*

4. G. TENELLA, *Fries in DC.* ix. p. 98.

In Afghanistan, *Griffith.* In Himalaya occidentali, *Falconer.* In Sikkim ad 10,000–17,000 ped. alt., *Hook. f. et Th.*

Calyx sæpe quam corollæ tubus dimidio brevior.

Hæc species miro modo *Pleurogynen carinthiacam* referens cum ea valde confusa est. Nempe in herbariis corollam *tubulosam Gentianæ* a corolla alte divisa *Pleurogynes* distinguere sæpe difficile est. Sed in *Gentiana tenella* fimbriæ ad apicem corollæ conspicuæ videntur: in *Pleurogyne* fimbriæ juxta basin corollæ latent.

Sect. CHONDROPHYLLUM. *Corolla parva, vix saltem uncialis, plicis aucta. Capsula (demum sæpe longissime) stipitata. Seminis testa adpressa, fusca. Herbæ (nisi* G. nudicaulis) *parvulæ, ramosæ.*

5. G. PROSTRATA, *Haenk. in DC.* ix. p. 106.

In Himalaya boreali-occidentali ad 16,000 ped. alt., *coll. Stoliczka.*

Differt a *Gentiana aquatica* foliis superioribus imbricatis, a *Gentiana pedicellata* sepalis triangularibus acutis neque albido subrecurvato acumine terminatis.

Forsan melius cum *Gentiana aquatica,* L., conjungenda.

6. G. ——, sp. no. 13, *Hook. f. et Th.*

Caulis debilis a basi laxe ramosus, 4–6-uncialis. Folia caulina remota, elliptica, subacuta, parva, tenuia, herbacea. Rami superne divaricato-ramosi, ultimi 1-flori fructu acute recurvati. Calyx semi-5-fidus, vix dimidium corollæ tubum superans, dentibus lanceolatis acutis erectis. Corolla $\frac{1}{2}$–$\frac{3}{4}$-uncialis, superne parum ampliata plicisque destituta, fimbriis multis azúreis ornata. Capsula brevis elliptica, longius stipitata, e corolla vix exserta aut partim exserta. Semina elongata trigona, testa adpressa.

In Sikkim ad 9000–12,000 ped. alt.

Species in omnibus partibus quam *Gentiana prostrata* multo major. Cf. *G. nutantem,* Bunge.

7. G. AQUATICA, *L. in DC.* ix. p. 106.—G. laxicaulis, *Zoll. in Miq. Flor. Ind.* ii. p. 560.

Caulis debilis, 2–6-uncialis, basi ramosus, ramis superne elongatis 1-floris. Folia inferiora imbricata, superiora remota, spathulato-ovata, apiculata, margine leviter albo-marginata. Calyx corollæ tubum fere æquans, breviter 5-fidus, segmentis lanceolatis acutis erectis. Corolla tubulosa, semiuncialis plicis bifidis ornata. Capsula brevis, obovato-

ellipsoidea, e corolla demum longe exserta. Semina oblonga trigona, testa adpressa.

In Himalaya occidentali ad 10,000–17,000 ped. alt. In Java, *coll. Horsfield.*

Vix differt a *Gentiana pedicellata*, var. *orbiculata*, Wallich, foliis superioribus remotis neque imbricatis, caulibus decumbentibus nec superne corymboso-ramosis, capsula longius (sæpe spatio ½–¾-unciali) exserta. An satis?

Gentiana no. 1049, Griffith, in Cabul lecta, differt capsula anguste oblonga e corolla longissime (sæpe spatio 1–2-unciali) exserta.

8. G. HUMILIS, *Stev. in DC.* ix. p. 106.

In Himalaya occidentali ad 14,000–18,000 ped. alt., *T. Thomson, Stoliczka.*

Caulis 2–6-uncialis. Folia haud albo marginata, aliquando spathulata. Capsula ellipsoidea, e corolla vix exserta.

9. G. SQUARROSA, *Ledeb. in. DC.* ix. p. 107.

In Sikkim ad 12,000–16,000 ped. alt., *coll. Hook. f. et Th.*

Capsula ellipsoidea, e corolla vix exserta. Folia suprema sæpe imbricata.

Ab omnibus vicinis speciebus nota calycis segmentis latis recurvatis.

10. G. ——, sp., no. 9, *Hook. et Th.*

Caulis nanus, 2-uncialis, dense ramosus, atratus. Folia ovali-oblonga, sessilia, vix ¼-uncialia, dense imbricata. Calyx brevis, semi-quinquefidus, segmentis ovatis obtusis erectis. Corolla vix semiuncialis.

In Sikkim ad 14,000–15,000 ped. alt., *coll. Hook. f. et Th.*

An *Gentianæ squarrosæ* forma alpina?

11. G. PEDICELLATA, *Wallich in DC.* ix. p. 107; *Wight, Icones*, t. 1328.—G. cuspidata, *Wallich.*

Caulis 2–8-uncialis, suberectus, a basi ramosus. Folia infima magna, elliptica, lanceolata aut lineari-lanceolata, 1–4-uncialia: superiora parva, oblonga aut subspathulata, vix albo-marginata. Calyx breviter 5-fidus, segmentis ovatis albo-cuspidatis aut lanceolatis recurvis aut suberectis. Corolla vix semiuncialis, tubulosa, plicis emarginatis ornata. Capsula brevis, obovata, corolla subinclusa aut vix exserta. Semina oblonga trigona, testa adpressa fusca.

In omni Himalaya a Bhotan ad Kashmir vulgaris ad 4000–8000 ped. alt. In Khasiæ collibus ad 5000 ped. alt. In Nilgiris montibus. In Burma. In China, *Dr. Maingay.*

β. var. ORBICULATA, *Wallich.*—G. zeylanica, *Griseb. in DC.* ix. p. 108. —G. quadrifaria, *Bl. in Miq. Flor. Ind.* ii. p. 560, *et in DC.* ix. p. 108.

Caulis strictiusculus. Folia subcruciatim disposita, superiora spathulata orbiculata conspicue albo-marginata. Folia infima quam caulina paullo majora consimilia.

In Java ad 6000–9000 ped. alt. In Zeylania ad 7000 ped. alt.; *coll. Thwaites*, no. 1873, *et T. Thomson*. In coll. Heyne (*Wall. Cat.* no. 4395). In Madras, *coll. Stocks*, distribuerunt *Hook. f. et Th.* no. 23, sub nomine *G. pedicellata*, Wall. var. In Nigiris, *coll. Wight*. In provincia Bombay, *coll. Dr. Gibson*. Hæc omnia exempla unicam speciem vel varietatem constituunt?

12. G. ARGENTEA, *Royle in DC.* ix. p. 107.

Caulis erectus, 6–1-uncialis aut subnullus: flores subterminales, congesti. Folia lanceolata acuta, argentea, albo-marginata, ima multo majora rosulata. Calyx semi- 5-fidus, segmentis longe lanceolatis albo-marginatis erectis corollam fere æquantibus. Corolla vix ½-uncialis, tubulosa, plicis ornata.

In Himalaya occidentali ad 4000–10,000 ped. alt., *Royle, Falconer, Stewart*.

β. G. sp. no. 19, *Hook. f. et Th.*; in Sikkim ad 15,000 ped. alt. Corolla paullo longiore.

13. G. APRICA, *Decaisne in DC.* ix. p. 107, ex Himalaya occidentali, mihi ignota: ex descriptione Grisebachii vix satis a *Gentiana pedicellata*, Wallich, differt.

14. G. CAPITATA, *Ham. in DC.* ix. p. 107.—Gentiana marginata, *Wallich*.

Caulis strictus, erectus, 6–2-uncialis, infra mox nudus, aut abbreviatus subacaulis, apice floribus capitatis foliis suppositis. Folia sub capitulis elliptica, spathulato-obtusa, sub-3-nervia, marginata. Calyx alte divisus, segmentis late oblongis acutis, margine scarioso-albidis. Corolla paullo e calyce exserta, plicis brevibus, fimbriis nullis. Capsula obovata elliptica, vix aut breviter stipitata, intra corollam omnino inclusa. Semina minuta, quam *Gentianæ pedicellatæ* multo minora, oblonga trigona.

In Himalaya occidentali. In Sikkim ad 6000–13,000 ped. alt. In Himalaya orientali. In collibus Khasiæ.

15. G. ANDERSONI, nov. sp.

Caulis 2–4-uncialis parum ramosus. Flores aggregati. Folia oblonga sessilia crassa 1–2-pollicaria vix marginata. Calyx semi- 5-fidus segmentis anguste oblongis acutis, margine scarioso-albidis, quam corollæ tubus brevioribus. Corolla ¾–1-uncialis, plicis aucta, fimbriis destituta. Capsula obovato-rotunda, breviter stipitata, fere intra corollam inclusa. Semina minuta, quam *Gentianæ pedicellatæ* multo-minora, oblonga trigona.

In Sikkim ad 5000 ped. alt., *coll. T. Anderson et Kurz*.

Species habitu *Gentianam marginatam*, Grisebach, referens, sed semi-

nibus minutis, calyce et corolla majore distincta. Forsan cum *Gentiana capitata*, Ham., melius conjungenda: differt corolla multo majore, calyce minus diviso, foliis superioribus oblongis nec obovatis.

16. G. DECEMFIDA, *Ham. in DC.* ix. p. 107.

In Himalaya occidentali, *coll. Royle, Falconer, Wallich, Edgworth, Parish.*

Calyx corollæ tubum vulgo æquans.

17. G. MARGINATA, *Grisebach in DC.* ix. p. 108; *nec* G. marginata, *Wallich.*

In Himalaya occidentali ad 8000–15,000 ped. alt., *coll. Royle, T. Thomson, Falconer, Stoliczka.*

Calyx ad $\frac{1}{4}$–$\frac{1}{3}$ partem divisus, dentibus triangulari-lanceolatis, margine scarioso-albidis. Corolla plicis et multis fimbriis ornata. Capsula obovata subsessilis omnino intra corollam inclusa. Semina oblonga trigona, quam in *Gentiana capitata* multo majora.

18. G. NUDICAULIS, *Kurz.*

Caulis erectus, 3–12-uncialis, ramosus, floribus numerosis approximatis. Folia inferiora mox decidua, superiora anguste oblonga 1–3-pollicaria sub-3-nervia haud marginata. Calyx semi- 5-fidus dentibus anguste lanceolatis corollæ tubum subæquantibus. Corolla fere uncialis, plicis fimbriisque ornata. Capsula obovata, breviter stipitata, intra corollam inclusa. Semina lineari-oblonga trigona, quam *Gentianæ marginatæ* majora.

In collibus Khasiæ. In Bengalia orientali, *coll. Griffith.*

β. compacta, *Kurz.* Caule brevissimo, floribus aggregatis.

In collibus Burmæ.

Sect. CROSSOPETALUM. *Corolla plicis destituta, non coronata, in margine loborum sæpe fimbriata. Capsula breviter stipitata. Semina exalata: testa laxa, reticulata, globosa, hyalino-albida, exsiccata sub lente quasi annulus hyalinus semini circumdatus exstat. Herbæ erectæ. Corollæ majores saltem unciales.*

19. G. DETONSA, *Fries in DC.* ix. p. 101.

In Himalaya occidentali ad 13,000–16,000 ped. alt., *coll. T. Thomson, Hay, Stoliczka.* Caulis ad 2 pedes altus, pedunculis ad 6 uncias longis.

β. G. no. 8, *Hook. f. et Th.*, in Sikkim ad 12,000–13,000 ped. alt. Calycis segmenta latiuscula.

In exemplis Indicis corolla angusta lobis subintegris: in exemplis Americanis corolla superne ampliata lobis fimbriatis.

Sect. EURYTHALIA. *Corolla plicis aucta, fimbriis coronata. Capsula stipitata. Seminis exalati testa laxa, reticulata, lucida. Flores terminales aggregati, majores saltem unciales. Folia margine cartilaginea.*

20. G. HUGELII, *Grisebach in DC.* ix. p. 108.
In Kashmir, *coll. Falconer.* Testa laxa, globosa; semina haud alata.

21. G. CORONATA, *Royle in DC.* ix. p. 109, ab Himalaya occidentali, mihi ignota.

22. G. CARINATA, *Griseb. in DC.* ix. p. 109, ab Himalaya occidentali, mihi ignota.

Sect. PNEUMONANTHE. *Corolla plicis aucta, non coronata. Capsula demum stipitata. Semina haud alata, testa laxa lucide reticulata. Corollæ saltem unciales.*

23. G. DEPRESSA, *Don in DC.* ix. p. 109.—Gent. stipitata, *Edgw.*
Caules 5–1-unciales, simplices, uniflori. Folia lanceolata aut obovata, apiculata, submarginata. Calyx semi- 5-fidus, segmentis late spathulato-oblongis acutis. Corolla 1–1½-uncialis, latiuscule campanulacea.
In Nepal, *Wallich*, no. 4387, caulibus valde abbreviatis. In Himalaya occidentali, *Royle, Edgworth* (et *Falconer* sub nomine *G. contorta*, Royle, quæ omnino differt calycis segmentis 4 lanceolatis).

24. G. CACHEMIRICA, *Decaisne in DC.* ix. p. 109, a Kashmir, mihi ignota.

25. G. ——, sp. no. 30, Hook. f. et Th.
Caules 3–1-unciales, juxta basin ramosi, dein simplices, uniflori, scarioso-carnei. Folia dense imbricata, obovata, apice præmorsa subemarginata, margine prominulo hyalino cincta, basi membranaceo-scariosa vaginantia. Calyx semi- 5-fidus, segmentis obovatis apice præmorsis subemarginatis, margine prominulo hyalino cinctis. Corolla 1¼-uncialis, campanulacea, plicis triangularibus donata.
In Sikkim ad 14,000–18,000 ped. alt., *coll. Hook. f. et Th.*, et *T. Anderson.*
An hæc planta vera *G. Cachemirica* esse potuit, sepalis obovatis non obstantibus?

26. G. ——, sp. sub nomine *G. venusta*, Wall., ab Hook. f. et Th. distributa.

Caulis simplex, erectus, 1–4-pollicaris, uniflorus. Folia (in caulibus elongatis remota) obovata obtusa, herbacea. Calyx 5-partitus, sepalis ellipticis aut obovatis obtusis $\frac{1}{2}$–$\frac{3}{4}$-uncialibus. Corolla $1\frac{1}{4}$–$1\frac{1}{2}$-pollicaris, superne ampliata, plicis ornata, corona destituta.

In Sikkim ad 13,000–15,000 ped. alt., *coll. Hook. f. et Th.*

Calyce a G. *venusta* (vicinisque speciebus) remota.

27. G. VENUSTA, *Wall. Cat.* no. 4319; *DC.* ix. p. 109.

Caules simplices, 1–6-unciales, apice 1–5-flori. Folia obovato-rotunda, subpetiolata, haud marginata. Calyx breviter 5-fidus, segmentis ovato-lanceolatis aut oblongis sæpe inæqualibus. Corolla $1\frac{1}{4}$-uncialis, superne parum ampliata, plicis triangularibus ornata. Capsula elliptica, utrinque angustata, e corolla partim aut vix exserta.

In Kemaon, Himalayæ occidentalis, *Wallich.*

Ex Grisebach in DC. flores subsolitarii; sed specimina Wallichii fere omnia pluriflora videntur.

28. G. TUBIFLORA, *Wallich in DC.* ix. p. 110.

In Nepal *Wallich.* In Sikkim ad 14,000–16,000 ped. alt., *Hook. f. et Th.*

Mihi videtur *Pneumonanthes* vera species, a cl. Grisebach in serie optime collocata.

29. G. ORNATA, *Wallich in DC.* x. p. 110.

In Nepal, *Wallich.* In Sikkim ad 10,000–17,000 ped. alt. frequens.

Capsula oblonga, e corolla demum longe (aliquando longissime) exserta. Corollæ 1–2-pollicares.

30. G. NUBIGENA, *Edgw.*—Gentiana, no. 39, *Hook. f. et Th.*

Caules 1–3-unciales, simplices, 1–2-flori. Folia carnosa, anguste oblonga aut linearia, obtusa. Calyx breviter 5-fidus, dentibus oblongis sæpe inæqualibus, quam corolla $\frac{1}{2}$ brevior. Corolla $1\frac{1}{2}$–2-uncialis, superne late ampliata, lobis brevibus. Capsula elliptica, semiexserta.

In Sikkim ad 16,000–17,000 ped. alt., *ex Hook. f. et Th.* In Himalaya occidentali, *Hay.*

31. G. ——, sp. no. 32, *Hook. f. et Th.*

Caules plures, decumbentes aut erecti, 4–15-unciales, simplices aut divisi. Folia caulina obovato-elliptica utrinque acutata, aut lanceolata. Flores ad apices ramorum congesti. Calyx breviter 5-fidus, lobis parvis oblongis sæpe inæqualibus. Corolla uncialis, superne dilatata, leviter 5-loba. Capsula elliptica utrinque acuta, fere intra corollam inclusa. Semina subglobosa, testa laxa reticulata lucida.

In Sikkim ad 13,000–16,000 ped. alt., *Hook. f. et Th.*

32. G. CRASSA, *Kurz*, nov. sp.

Caulis suffrutescens, ramosus. Folia crassa, elliptica utrinque acuminata (basi connata et in caule quasi linea scabra decurrentia), margine scabra neque hyalina, sub-3-nervia. Flores ad apices ramorum congesti. Calyx semi-5-fidus, lobis ellipticis patulis herbaceis margine scabris. Corolla 1-uncialis, clavata, plicis subemarginatis ornata. Capsula stipitata, elliptica utrinque angustata, e corolla semiexserta. Semina subglobosa, testa laxa reticulata lucida.

In montibus Burmæ, *coll. Kurz.*

Cf. *Gentianam scabram*, Bunge, DC. ix. p. 112.

Sect. KURROO. *Seminum testa adpressa, fusca, haud conspicue reticulata. Semina elongata, falcata, complanata. Corolla majuscula,* 1–3-*uncialis, plicis aucta, non coronata.*

33. G. KURROO, *Royle in DC.* ix. pl. 110.

Rhizoma perenne, apice foliis linearibus 2–6-uncialibus coronatum. Caules annui 3–12-unciales, apice racemose 1–6-flori. Folia caulina linearia, 1–2-uncialia. Calyx semi-5-fidus, lobis linearibus $\frac{1}{2}$–$\frac{3}{4}$-uncialibus tubum subæquantibus. Corolla 2-uncialis, clavata, lobis majusculis late ovatis acutis, plicis triangularibus. Capsula elliptica utrinque acutata, e corolla parum exserta. Semina oblongo-falcata, complanata, apice tenuia, haud alata: testa adpressa.

In Himalaya occidentali ad 6000–10,000 ped. alt., *coll. Royle, Falconer et T. Thomson.*

34. G. OLIVIERI, *Griseb. in DC.* ix. p. 110.

In Himalaya occidentali, *T. Thomson, Hay*; in Scinde, *Stocks*; in Afghanistan, *Griffith.*

Capsula elliptica, e corolla parum exserta. Semina complanata, obovato-falcata, apice tenuia, haud alata: testa adpressa.

Species a *G. decumbente*, L., distinguenda calyce haud spathaceo, corollæ lobis elongatis. Cyma valde variabilis, umbelliformis, racemiformis aut capitata, pauciflora aut multiflora.

An satis a sequente differt?

35. G. DECUMBENS, *L. in DC.* ix. p. 110.

In Zanskar, Himalayæ occidentalis, *coll. Stoliczka.* In Soongaria.

Calyx dimidiato-spathaceus segmentis obtusis in dentes subulatos subito angustatis. Corollæ lobi lati, apice rotundati.

36. G. CONTORTA, *Royle in DC.* ix. p. 94, ex Himalaya occidentali, mihi ignota, remanet dubia, certe non congener *Gentianæ oligospermæ* (quacum Grisebach conjunxit), quæ est *Jæschkea*, infra.

JÆSCHKEA, *Kurz in Asiatic Society of Bengal Journ.* vol. xxxix. part ii. 1870, p. 229.

Calyx subæqualiter 5-partitus. *Corolla* campanulata breviter 5-loba marcescens, fauce nuda, foveis destituta. *Stamina* 5 in sinubus loborum corollæ sita: filamenta brevissima. *Ovula* c. 8. *Stylus* longiusculus bipartitus. *Capsula* subsessilis bivalvis, septicida, unilocularis. Semina magna ellipsoidea lævia, placentis membranaceis adnata.

Herbæ annuæ glabræ; caulibus subtetragonis rectis foliisque oppositis. Cyma subpaniculata. (*Differt a* Gentiana *staminibus et præcipue seminibus.*)

1. JÆSCHKEA GENTIANOIDES, *Kurz, l. c.*—Gentiana oligosperma, *Grisebach in DC.* ix. p. 94.—G. Jæschkei, *Kurz, in Seemann, Journ. Bot.* 1867, p. 241.

Caulis strictus 6–24-uncialis, obscure tetragonus. Folia ima spathulata superiora remota lanceolata sessilia. Flores fere semipollicares violacei in cyma elongato-pyramidata dispositi. Sepala linearia lanceolatave corollæ tubo breviora. Folia suprema (cymæ bracteæ) lanceolata aut linearia. Capsula subsessilis elliptica superne acuta stylo longiusculo coronata. Semina ovoideo-cylindrica.

In Himalaya occidentali ad 9000–15000 ped. alt., *coll. R. Jæschke, Falconer, Brandis* et *Hay* (et *Hugel* ex *Griseb.*).

2. J. LATISEPALA, nov. sp.

Caulis strictus 18-uncialis, subtetragonus. Folia ovali-oblonga, oblonga lanceolataque sessilia. Flores ½–¾-unciales in cyma elongato-pyramidali dispositi. Sepala obovata subito acuta corollæ tubo breviora. Folia suprema (cymæ bracteæ) late ovata aut obovata obtusiuscula. Capsula subsessilis elliptica superne acuta stylo longiusculo coronata. Semina ovoideo-cylindrica.

In Murree, Himalayæ occidentalis, ad 5000 ped. alt.

Flores et semina quam in sp. præcedente majores.

CRAWFURDIA, *Wall. in DC.* ix. p. 120 (cum *Tripterospermo*, Bl. in DC. ix. p. 121), char. emendato.

Calyx 5-fidus. *Corolla* majuscula, marcescens, clavata, foveis glandulisque destituta, limbo 5-fido, plicis aucta. *Stamina* 5. *Ovarium* disco hypogyno 5-fido basi cinctum. *Stylus* distinctus, persistens, stigmatibus 2 revolutis. *Capsula* stipitata, bivalvis septicida aut baccata. *Semina* complanata, suborbicularia, undique alata.

Herbæ late volubiles: rami elongati: folia 3-nervia aut basi sub-

5-nervia, petiolata, acuminata. Flores terminales et præcipue axillares oppositi. Pedunculi 1–2 e singulis binarum axillarum oppositarum enati.

Sect. DIPTEROSPERMUM. *Capsula papyracea. Semina placentis immersa, tenuia, complanata, undique simpliciter alata: hinc sectione horizontali dipterosperma. Calycis tubus lævissimus.*

Species. *Crawfurdia speciosa* et *puberula.*

Sect. TRIPTEROSPERMUM (genus Blumei). *Capsula baccata. Semina libera, crassiora, complanata, undique alata, ala altero latere simplici, altero latere bifida: hinc sectione horizontali tripterosperma. Calycis tubus 5-carinatus aut fere alatus.*

Species. *Crawfurdia fasciculata, luteo-viridis, japonica* et *trinervis.*

1. CRAWFURDIA (DIPTEROSPERMUM) SPECIOSA, *Wallich in DC.* ix. p. 120.

Folia lanceolata aut elliptico-lanceolata, e basi angustata aut rotundata, glabra nisi marginibus aliquando minute glanduloso-puberulis. Petioli glabri. Pedunculi 1 aut 2 in quaque axilla, aut 1 fere ad basin partitus, plus minus elongati (usque ad 6 uncias), torti, nudi aut bibracteolati. Calycis tubus cylindricus, apice truncatus, dentibus triangulari-oblongis (dimidio tubi brevioribus) patulis infra marginem limbi enatis. Corolla clavata, superne ampliata, purpurascenti-rosea. Capsula elliptica, papyracea, complanata, stipitem subæquans.

In Sikkim ad 6000–10,000 ped. alt.: et in Khasiæ collibus ad 4000–5000 ped. alt. frequens. In Assam, Bhotan et Nepal.

2. C. (DIPTEROSPERMUM) PUBERULA, nov. sp.

Folia anguste lanceolata, e basi cordata, pagina superiore, nervis infra, marginibusque glanduloso-puberulis. Petioli glandulosi-puberuli. Pedunculi 1 aut 2 in quaque axilla, aut 1 fere ad basin partitus, ad 1 unciam elongati. Calycis tubus cylindricus, dentibus erectis linearibus, dimidio tubi longioribus. Corolla clavata, superne ampliata, purpurascenti-rosea. Capsula elliptica, papyracea, complanata, stipitem subæquans.

Sikkim, neque infra 10,000 ped. alt., *C. B. C.*

3. C. (TRIPTEROSPERMUM) FASCICULATA, *Wallich in DC.* ix. p. 120, *partim.*

Folia oblongo-lanceolata, basi angustata, glabra. Petioli glabri. Pedunculi 1 aut 2 in quaque axilla, brevissimi vix ulli. Calycis tubus 5-carinatus, dentibus linearibus dimidio tubi longioribus. Corolla apice

contracta purpurascenti-rosea. Capsula vix baccata, oblonga, stipitem ter superans.

In Khasiæ collibus ad 3000–5000 ped. alt. frequens. Neque in Nepalia. Specimina Wallichiana sub nomine *Crawfurdiæ fasciculatæ* in Nepalia lecta ad *Crawfurdiam luteo-viridem* referenda sunt.

4. C. (TRIPTEROSPERMUM) LUTEO-VIRIDIS, nov. sp.—C. fasciculata, *Wallich in DC.* ix. p. 120, *partim.*

Folia oblongo-lanceolata, basi cordata, glabra. Pedunculi 1 aut 2 in quaque axilla, abbreviati. Calycis tubus 5-carinatus, dentibus linearibus tubum subæquantibus. Corolla apice angusta, luteo-viridis. Capsula baccata, oblonga, stipitem ter superans.

In omni Himalaya a Bhotan ad Kemaoon ad 5000–10,000 ped. alt. frequens.

In unico exemplo a Kurz in Sikkim lecto corolla purpurascens tubo superne ampliato videtur: sed capsula, folia et calyx *Crawfurdiæ luteo-viridis.*

5. C. (TRIPTEROSPERMUM) BLUMEI, *Don, Miq. Flor. Ind.* ii. p. 561.—Tripterospermum trinerve, *Bl. in DC.* ix. p. 121.

In montibus Javæ.

Pedunculi 1-flori, sæpius bibracteolati, ad 1-3 uncias elongati. Flores minores. Bacca oblonga.

6. C. (TRIPTEROSPERMUM) JAPONICA, *Sieb. et Zucc.*, ex Japonia, differt capsula rotundata (vix elliptica) in stipite longo e corolla exserta.

PLEUROGYNE, *Eschscholtz in DC.* ix. p. 121.

[Differt a *Gentiana* corolla fere ad basin partita.]

1. PLEUROGYNE CARINTHIACA, *Griseb. in DC.* ix. p. 122.—Lomatogonium carinthiacum, *Koch, Synops. Flor. Germ. et Helv.* p. 422.

In Sikkim, Nepal et Himalaya occidentali ad 10,000–17,000 ped. alt., *coll. Falconer, Griffith, T. Thomson, Hook. f., T. Anderson, Hay, Stoliczka.*

β. Floribus majoribus: foliis imis spathulato-oblongis, superioribus anguste oblongis: sepalis angustis. *Pl. spathulata,* A. Kerner.

OPHELIA, *Don in DC.* ix. p. 123.

Calyx fere ad basin 4–5-partitus. *Corolla* marcescens, altius divisa, plicis coronaque destituta, juxta basin foveis (rarius obsoletis) nunc nudis nunc squamula tectis. *Stamina* 4–5. *Stigmata* bina brevia. *Capsula* bivalvis septicida. *Semina*

perplurima, minima, polyhedrica, testa adpressa, vel majora ellipsoidea lævia.

Herbæ strictæ paniculatæ. Folia omnia opposita.

Genus male limitatum. *Swertia* differt (?) foliis infimis sæpe alternis, foveis supra nec juxta basin corollæ sitis, quoad enim foveas nudas *Swertiæ*, in *Ophelia* foveæ sæpe videntur nudæ. In *Ophelia minore* foveæ (in exemplis Peninsularibus) omnino obsoletæ, et dein species nullo charactere a *Pleurogyne* distingui potest. In *Ophelia racemosa* calyx corollaque tubulosi neque ad basin divisi sunt. Denique *Ophelia macrosperma* omnino (quoad habitum, semina et corollæ segmenta fructu patula neque circa capsulam arcte contorta) cum *Halenia* militat, sed characteris trivalvis ope (*i. e.* foveis in calcare non productis) in *Ophelia* retenta est. Ex illa parte *Swertia* species habitu seminibusque longe remotas amplectitur. Sed hæc genera rectius ordinando necesse est omnes species botanicis notas perscrutare.

Sect. A. Semina minuta. Flores (saltem partim) 5-meri.

Foveolæ binæ............ *Ophelia purpurascens.*
Foveola solitaria ...... *Ophelia Dalhousiana, paniculata, cordata.*

Sect. B. Semina minuta. Flores omnes 4-meri.

Foveola solitaria (aut in *Oph. minore* subnulla).
Australiores .... *Ophelia zeylanica, corymbosa, Grisebachiana, densiflora, florida, minor.*
Boreales.............. *Ophelia pulchella, nervosa, angustifolia, alata.*
Foveolæ binæ........... *Ophelia chirata.*

Sect. C. Semina majuscula. (Species forsan ad alia genera amandandæ.)

Corolla tubulosa ...... *Ophelia racemosa.*
Corolla fere ad basin partita.
Ophelia javanica, macrosperma.

[*Ophelia bimaculata*, Sieb. et Zucc., cum *Swertia* militat.]

Sect. A. *Semina minuta, polyhedrica, testa adpressa. Flores normaliter 5-meri.*

1. OPHELIA PURPURASCENS, *Don in DC.* ix. p. 124.
In Himalaya occidentali, *Wallich* et *Royle.*

β. O. CILIATA, *Don.* Nana, 2–6-uncialis.
In Himalaya occidentali. In Sikkim ad 14,000 ped. alt., *T. Anderson.*

2. O. DALHOUSIANA, *Grisebach in DC.* ix. p. 123.
In Himalaya occidentali, *coll. Hook. f. et Th.*

3. O. PANICULATA, *Don in DC.* ix. p. 124.
In Sikkim ad 4000–10,000 ped. alt. frequens. In Nepal et Himalaya occidentali.

β. O. BRACHYPETALA, *Griseb.* Sepala elongato-linearia, corollam longe superantia, dorso conspicue trinervia.
In Nepalia, *coll. Wallich, Cat.* no. 4374 et 4374A. An bona species?

4. O. CORDATA, *Don in DC.* ix. p. 124.
In Khasiæ collibus ad 4000–5000 ped. alt. vulgaris.
In Himalaya occidentali, *coll. Falconer, Royle, T. Thomson, Dr. Clark.* In herbario Horti Botanici Calcuttensis exempla hujus species ex Himalaya centrali (*i. e.* Nepal et Sikkim) et orientali omnino desunt.
Specimen Wallichianum, no. 4378, in Kemaoon Himalayæ occidentalis lectum, sub nomine *Swertia cordata* conservatum, floribus omnibus 4-meris, caule tetraptero gaudet et est *Ophelia alata,* Grisebach.

Sect. B. *Semina minuta, polyhedrica, testa adpressa. Flores omnes 4-meri.*

5. O. ZEYLANICA, *Grisebach in DC.* ix. p. 124.
In Zeylania ad 7000 ped. alt., *Thwaites.*
In exemplis Thwaitesianis, pedicelli solitarii oppositi, nodis ramorum cymæ abbreviatis, neque (ut dicit Grisebach) pedicelli fastigiati, cyma umbelliformis.

6. O. CORYMBOSA, *Wight, Icones,* t. 1329.—O. corymbosa, *Grieseb. in DC.* ix. p. 125, partim.
In montibus Peninsulæ, *Wight, T. Thomson, T. Anderson, Beddome*; et Malabar, *Stocks.*
Caulis circiter pedalis, sæpe a basi ramosus. Folia obovata et elliptica, obtusa. Cymæ densæ aut paucifloræ. Petala obovato-oblonga, acuta, cærulea.

7. O. Grisebachiana, *Wight, Icones*, t. 1330.—O. corymbosa, *Griseb. in DC.* ix. p. 125, *partim.*—O. pauciflora, *Dalz. in Walp. Ann.* v. p. 416.—Ophelia umbellata, *MS. in Hort. Bot. Calcuttensi.*

In montibus Peninsulæ, Nilgiris et Pulney, frequens.

Caulis sæpe 2–3-pedalis, basi sæpius simplex, erectus, apice late corymbosus. Folia ovata aut oblonga, acuta. Rami cymæ sæpe umbellati. Petala alba, elongato-lanceolata.

8. O. densiflora, *Grisebach.*—O. multiflora, *Dalzell in Walp. Ann.* iii. p. 86.—O. ——, sp. no. 10, *Hook. f. et Th.*

Caulis tetragonus, elatior, basi simplex, erectus, apice dense corymbosus. Folia ovata, obtusa, sessilia, 5-nervia. Cyma multiflora, pedicellis ultimis permultis congestis. Sepala lineari-lanceolata, petalis obovato-oblongis acutis breviora. Fovea solitaria, orbiculata, fimbriata.

In Malabar, Concan, Mahabeleshwur, *coll. Stocks, Dr. Gibson.*

9. O. florida, *Don in DC.* ix. p. 125.—Swertia (aut Ophelia) pulchella, *Wallich, Cat.* no. 4382.

In collibus Burmæ, *Wallich.* In Tenasserim, *Helfer.*

10. O. minor, *Grisebach in DC.* ix. p. 126.

In Nilgiris, *Wight*: in Malabar, *Stocks.*

Forma Peninsularis, foveis omnino obsoletis. Species a *Pleurogyne carinthiaca* parum remota.

11. O. pulchella, *Don in DC.* ix. p. 126.—O. elegans, *Wight, Icones*, t. 1331.

In Khasiæ collibus ad 4000–6000 ped. alt. vulgaris. In collibus Burmæ et Peninsulæ. In omni Himalaya.

β (var.). O. pumila, *Grisebach* = O. elegans, *Wallich nec Wight.*

In Oude, *coll. Wallich,* Cat. no. 4376. Species pumila 2–5-uncialis sed omnino cum characteribus *O. pulchellæ* congruens.

γ. O. oxyphylla, *Miq. Flor. Ind.* ii. p. 562.

In Java, *coll. Horsfield.* Mihi videtur exacte *O. elegans,* Wight, i. e. *O. pulchella,* Don.

An differt *O. cærulescens,* Miq. l. c.

δ. O. porrigens, *Don.*

In Himalaya occidentali, *coll. Royle et Falconer.*

Differt foliis angustissimis, caulibus strictioribus.

12. O. nervosa, *Grisebach in DC.* ix. p. 125.

In Sikkim ad 6000–9000 ped. alt. In Nepal et Himalaya occidentali. Corolla lurido-viridis neque (ut in *O. angustifolia*) albida. Ab *O.*

angustifolia præterea differt habitu minus diffuso, foliis subtus pruinosis, elliptico-lanceolatis neque anguste oblongis.

13. O. ANGUSTIFOLIA, *Don in DC.* ix. p. 126.—O. pratensis, *Edgw. Walp. Ann.* vi. p. 508.

In Sikkim ad 1000–4000 ped. alt. vulgaris. In omni Himalaya. In Khasiæ collibus.

Sepala sæpe inæqualia et pro parte vix corollam superantia.

14. O. ALATA, *Grisebach in DC.* ix. p. 127.

In Himalaya occidentali, Kemaoon, *coll. Wallich.*

Species fovea solitaria et habitu ad *Opheliam cordatam* accedens; ab *O. chirata* omnino distincta.

O. Wilfordii, A. Kerner, ab hac specie haud longe militat.

15. O. CHIRATA, *Grisebach in DC.* ix. p. 127.—Gentiana chirata, *Roxb. Flor. Ind.* ii. p. 71.—O. lurida, *Don in DC.* ix. p. 124.—Ophelia ——, no. 20, *Hook. f. et Th.*

In Sikkim ad 4000–7000 ped. alt. haud frequens. In Nepal et Himalaya occidentali vulgatior. In Himalaya orientali et Khasiæ collibus haud frequens.

Ab omnibus speciebus 4-meris præcedentibus a foveis binis facile distinguenda.

O. lurida, Don, ex Himalaya occidentali nisi floribus paullo minoribus non differt. In *O. chirata* flores semper luridi luteo-purpurascenti-virides.

O. ——, sp. no. 20, Hook. f. et Th. ex Himalaya orientali et Khasiæ collibus paullum recedit foliis 3-nerviis versus basin angustatis subpetiolatis.

Sect. C. *Semina majuscula, ellipsoidea aut ovoideo-cylindrica, lævia.*

(Species tres hoc loco inclusæ a genere multis notis recedunt.)

16. O. RACEMOSA, *Grisebach in DC.* ix. p. 127.

In Nepal, *Wallich.*

Calyx ad $\frac{2}{3}$ (aliquando vix ad $\frac{1}{2}$) partem divisus. Corolla ad $\frac{2}{3}$ partem divisa. Semina quam in *Opheliis* veris majora, ellipsoidea, lævia.

17. O. JAVANICA, *Hassk. in Miq. Flor. Ind.* ii. p. 561.

In montibus Javæ ad 4000–7000 ped. alt.

Cyma elongato-pyramidalis, foliosa. Semina majuscula, ellipsoidea, lævia. Ad basin petali fovea magna, squama tecta, vix fimbriata. Corolla fere ad basin partita. Filamenta linearia.

Species ab *O. Grisebachiana*, Wight (quacum Miquel confert), longe remota, tam seminibus quam inflorescentia.

18. O. MACROSPERMA, *MS. in Horto Bot. Calcuttensi.*—O. ——, sp. no. 15, *Hook. et Th.*

Caulis tetragonus, elatior. Rami paniculati, patentes. Folia ovata, acuta, sessilia. Cymæ pedicellis longiusculis, diffusæ. Calycis segmenta 5, lanceolata, corolla breviora, ima basi connexa. Corolla fere ad basin divisa, 5-mera, ochroleuca; foveolæ binæ, squamis fimbriato-pilosis ornatæ. Capsula ovata, apice acuta; petala marcescentia, demum a capsula distantia. Semina, pro genere maxima, ellipsoidea, lævia.

In Khasiæ collibus ad 4000–5000 ped. alt. vulgaris.

Variat rarissime floribus plenis.

Species quoad habitum semina et petala demum patula cum *Halenia* arcte associata.

19. O. DENSIFOLIA, *Grisebach, in DC.* ix. p. 125, e Tibet, mihi ignota.

HALENIA, *Borkh. in DC.* ix. p. 128.

1. HALENIA ELLIPTICA, *Don in DC.* ix. p. 129.

In Sikkim ad 7000–13,000 ped. alt. In omni Himalaya.

Semina oblongo-ellipsoidea, lævia, quam in *Opheliis* veris multo majora.

2. H. PERROTTETII, *Grisebach in DC.* ix. p. 129, *Wight, Icones,* t. 1334.

In Nilgiris et Pulney collibus ad 7000–8000 ped. alt.

Semina oblongo-ellipsoidea, lævia, quam in *Opheliis* veris majora.

SWERTIA, *L. in DC.* ix. p. 131.

Calyx 5–4-partitus. *Corolla* marcescens, foveis margine fimbriatis, squamula destitutis, non calcaratis. *Capsula* bivalvis, septicida. *Semina* placentis immersa, plurima.

Herbæ plerumque perennes, foliis imis plerumque alternis aut fastigiatis.

Genus species haud multas sed habitu characteribusque valde diversas includens. Caulis erectus, simplex, elatior aut humilis, ramosus. Cymæ elongatæ, racemiformes, vel depauperatæ patulæ. Stylus elongatus aut subnullus. Stigma subreniforme vel bilobatum. Corolla demum circa capsulam contorta aut patula. Semina minora, testa lævi, aut mediocria testa laxa, aut majora complanata alata. Inter tantam diversitatem *Ophelia* charactere

nullo separata quasi genus distinctum retenta est: mihi vix bona sectio. Cf. notulas supra sub *Ophelia*.

1. SWERTIA CÆRULEA, *Royle in DC.* ix. p. 132, ex Himalaya occidentali, mihi ignota.

2. S. HUGELII, *Grisebach in DC.* ix. p. 133, ex Himalaya occidentali, mihi ignota.

3. S. CUNEATA, *Wallich in DC.* ix. p. 133.—S. lahulensis, *A. Kerner*.

In Sikkim ad 12,000–14,000 ped. alt., *Hook. et Th.* In Himalaya occidentali. Stylus nullus. Stigmata brevissima.

4. S. ALTERNIFOLIA, *Royle in DC.* ix. p. 133, ex Himalaya occidentali, mihi ignota.

5. S. BIMACULATA, *Hook. f. et Th.*, i. e. O. bimaculata, *Sieb. et Zucc.*

Caulis tetragonus, elatus, basi simplex, superne late corymbosus. Folia elliptico-lanceolata, petiolata, 3-nervia. Cymæ pedicellis elongatis, diffusæ, corymbiformes. Calycis segmenta 5 aut 4, oblonga, corolla multo breviora. Petala ad mediam partem binis maculis viridibus, superne nigris punctulis notata. Stylus nullus. Stigmata brevia, acuta. Capsula oblonga neque ovata. Semina parva nec minima, testa adpressa.

In Sikkim Britannica ad 6000–8000 ped. alt. vulgaris. In Japonia, *Sieb. et Zucc.* Neque alibi?

Hæc planta an sit *Ophelia* an *Swertia* omnino dubia. Foveæ corollæ nudæ nec squamula tectæ. Stigmata acuta nec rotundata. Inflorescentia corymbosa ad *Opheliam*, petala demum patula potius ad *Swertiam* spectant.

6. S. PETIOLATA, *Royle in DC.* ix. p. 133.

In Himalaya occidentali ad 7000–9000 ped. alt., *coll. T. Thomson*. In Afghanistan, *Griffith*.

Semina subglobosa, testa laxa. Stylus subnullus; stigmata brevia, obtusa.

7. S. SPECIOSA, *Wallich in DC.* ix. p. 133.

In Sikkim ad 10,000–14,000 ped. alt. In Nepal et Himalaya occidentali.

8. S. MULTICAULIS, *Don in DC.* ix. p. 134.

Caules a collo rhizomatis perplurimi, 3–6-unciales, parum divisi, floribus terminalibus subsolitariis. Folia ad collum rhizomatis elongato-lanceolati 2–4-unciales, caulina pauca angusta. Sepala 5, oblonga, petalis multo breviora. Petala luride cærulea, in media parte bifoveolata,

superne fimbriis longis ornata, circa capsulam demum cohærentia. Semina, pro genere mediocria, ellipsoidea, lævia, obscure reticulata.

In Sikkim ad 13,000–17,000 ped. alt.

S. javanica, Bl. in DC. ix. p. 134, est *Ophelia.*

LIMNANTHEMUM, *Gmel. in DC.* ix. p. 138.

1. LIMNANTHEMUM NYMPHOIDES, *Link in DC.* ix. p. 138.

In Kashmir, ex Grisebach, *l. c.* Nullum exemplum Indicum mihi obvium.

2. L. CRISTATUM, *Griseb. in DC.* ix. p. 139; *Miq. Flor. Ind.* ii. p. 563. —L. aurantiacum, *Dalzell in Walp. Ann.* iii. p. 87.—Menyanthes cristata, *Roxb. Flor. Ind.* ii. p. 29 (ed. *Wallich*).

In omni Bengalia vulgaris.

A Zeylania ad Himalayam. In Burma. In Malaya. In Madagascar et Bourbon.

Capsula 5–20-sperma, nec (ut dicit Grisebach) 2–1-sperma.

3. L. INDICUM, *Griseb. in DC.* ix. p. 139; *Miq. Flor. Ind.* ii. p. 563: inclus. L. Wightiano, *Grisebach in DC.* ix. p. 139; *Miq. Flor. Ind.* ii. p. 564.—Menyanthes indica, *Roxb. Flor. Ind.* ii. p. 31 (ed. *Wallich*).

In omni Bengalia vulgaris.

In Zeylania, Peninsula, India boreali-occidentali. Malaya.

Semina complanato-globosa, minutis puncticulis elevatis ornata.

4. L. KLEINIANUM, *Griseb. in DC.* ix. p. 139.—L. calycinum, *Miq. Flor. Ind.* ii. p. 564.

In omni Bengalia vulgaris.

In Zeylania ad Himalayam. In Burma, Malaya. In insulis Fiji.

Semina complanato-globosa, lucide lævia, vix puncticulata. Cum præcedente specie melius conjungenda.

5. L. FORBESIANUM, *Griseb. in DC.* ix. p. 139.—L. biflorum, *Thwaites, C. P.* no. 1869, *ex Kurz.*

In Peninsula et Zeylania. In Malabar, *Stocks.*

6. L. PARVIFOLIUM, *Griseb. in DC.* ix. p. 141.—L. tenellum, *J. E. Sm. ex Hook. et Th.*—L. Moonii, *Thwaites, C. P.* no. 2842, *ex Kurz.*

In Chittagong, *Hook. f. et Th.* In Tavoy, *Wallich.* In Malabar, *Stocks.* In Zeylania (*i. e.* no. 2842, *Thwaites,* C. P.).

TABLE I.

	1. Bengaliæ planities.	2. Burma et Tavoy.	3. Colles Khasiæ.	4. Himalaya orientalis.	5. Himalaya centralis (Sikkim et Nepal).	6. Himalaya occidentalis cum Ladakh &c.	7. Punjab et Scinde.	8. Bombay et Malabaria cum montibus.	9 Coromandelia cum montibus.	10. Zeylania.	11. Malaya.
Exacum teres			*		*						
E. tetragonum	*		*	*	*	*		*			
E. Horsfieldianum ?											*
E. bicolor	*							*	*		
E. sulcatum	*	*							*		*
E. Wightianum									*		
E. foliosum											
E. courtallense									*		
E. zeylanicum										*	
E. Walkeri										*	
E. macranthum										*	
E. ovale										*	
E. Beddomei									*		
E. pumilum								*			
E. pedunculatum	*					*		*	*		
E. petiolare								*	*	*	
E. sessile								*		*	
E. pteranthum		*									
	4	2	2	1	2	1	0	6	7	6	2

Table I. (*continued*).

	1. Bengaliæ planities.	2. Burma et Tavoy.	3. Colles Khasiæ.	4. Himalaya orientalis.	5. Himalaya centralis (Sikkim et Nepal).	6. Himalaya occidentalis cum Ladakh &c.	7. Punjab et Scinde.	8. Bombay et Malabaria cum montibus.	9. Coromandelia cum montibus.	10. Zeylania.	11. Malaya.	
Brought forward	4	2	2	1	2	1	0	6	7	6	2	
Sebæa Khasiana			*									
Erythræa ramosissima	*						*	*	*			Asia occidentalis. Europa australis.
E. sp.							*					
E. spicata							*					In Cabul: Persia: Europa australi.
Orthostemon Hugelii												
Pladera pusilla	*						*	*	*			
P. fastigiata?										*		
Canscora diffusa	*	*					*	*	*		*	In Abyssinia.
C. decurrens								*	*			
C. Laurii								*				
C. sessiliflora								*	*	*		
C. decussata	*	*				*			*	*		
C. macrocalyx											*	
C. alata								*	*			
C. perfoliata								*	*	*		
C. andrographioides			*									
Heterocanscora Schultesii		*										

Phyllocyclus Helferi		*										
P. Parishii		*										
Slevogtia orientalis							*	*	*	*	*	In Nubia.
Gentiana Moorcroftiana						*						
G. Falconeri						*						
G. Stoliczkæ						*						
G. tenella					*	*	*					In Afghanistan. Asia et Europa a lpina.
G. prostrata						*	*					
G. sp. no. 13, Hook. et Th.					*							
G. aquatica						*					*	Asia frigidior.
G. humilis						*						Altai et Caucasus.
G. squarrosa					*							
G. sp. no. 9, Hook. et Th.					*							,, ,,
G. pedicellata		*	*	*	*	*		*	*	*	*	In China.
G. argentea					*	*						
G. aprica						*						
G. capitata			*	*	*	*						
G. Andersoni					*							
G. decemfida						*						
G. marginata						*						
G. nudicaulis		*	*									
G. detonsa					*	*						Altai. America arctica.
G. Hugelii						*						
G. coronata						*						
G. carinata						*						
G. depressa					*	*						
G. Cachemirica						*						
G. sp. no. 30, Hook. et Th.					*							
G. sp.					*							
G. venusta						*						
G. tubiflora					*							
G. ornata					*							
	8	9	7	3	16	22	8	16	17	12	7	

TABLE I. (*continued.*)

	1. Bengaliæ planities.	2. Burma et Tavoy.	3. Colles Khasiæ.	4. Himalaya orientalis.	5. Himalaya centralis (Sikkim et Nepal).	6. Himalaya occidentalis cum Ladakh &c.	7. Punjab et Scinde.	8. Bombay et Malabaria cum montibus.	9. Coromandelia cum montibus.	10. Zeylania.	11. Malaya.	
Brought forward	8	9	7	3	16	22	8	16	17	12	7	
Gentiana nubigena					*	*						
G. sp. no. 32					*							
G. crassa		*										
G. kurroo						*						
G. Olivieri						*	*					Afghanistan; Persia.
G. decumbens						*						Soongaria; Altai.
G. contorta						*						
Jæschkea gentianoides						*						
J. latisepala						*						
Crawfurdia speciosa			*	*	*							
C. puberula					*							
C. fasciculata			*									
C. luteo-viridis				*	*	*						
C. Blumei											*	
Pleurogyne carinthiaca					*	*						Altai; Caucasus; Alpes.
Ophelia purpurascens						*						
O. Dalhousiana						*						

O. paniculata					*	*						
O. cordata			*			*						
O. zeylanica										*		
O. corymbosa								*	*			
O. Grisebachiana								*	*			
O. densiflora								*				
O. florida		*										
O. minor									*			
O. pulchella		*	*	*	*	*			*		*	
O. nervosa					*	*						
O. angustifolia			*	*	*	*						
O. alata						*						
O. chirata			*	*	*	*						
O. racemosa					*							
O javanica											*	
O. macrosperma			*									
Halenia elliptica				*	*	*						
H. Perrottetii									*			
Swertia cærulea						*						
S. Hugelii						*						
S. cuneata					*	*						
S. alternifolia						*						
S. bimaculata					*							
S. petiolata						*						Afghanistan.
S. speciosa					*	*						
S. multicaulis					*							
Limnanthemum nymphoides						*						Asia centrali ; Europa.
L. cristatum	*	*					*	*	*	*	*	Madagascar et Bourbon.
L. indicum	*						*		*	*	*	
L. Kleinianum	*	*					*	*	*	*	*	In Fiji insulis.
L. Forbesianum								*	*	*		Mozambique.
L. parvifolium	*	*						*		*		
116 species.	12	15	14	9	33	48	12	23	26	18	13	

The distribution in this Table must not be supposed complete; and the results can only be argued from in a very general way. The East Himalaya has been very slightly examined; and the number of species really to be found there is doubtless greater than the Table shows. But I think it may be safely concluded that the number of species of Gentianaceæ diminishes as we proceed eastward along the Himalaya. There appears to be a kind of second centre of Gentianaceæ in the plateau of the Deccan and Ceylon; but the species here are in many cases very closely allied, and the numerical result rather exaggerates the truth.

Subjoined is a Table of the generic distribution on larger botanical areas.

TABLE II.

	Bengaliæ planities.	A Khasia ad Japan.	Himalaya.	Punjab et Scinde.	Peninsula cum Zeylania.	India.	Orbis terrarum.	
Exacum	4	5	3	0	14	18	19	Species unica in Madagasca, cæteræ Indicæ.
Sebæa	0	1	0	0	0	1	10	Species 7 Capenses, 2 Madagascariæ, 1 Australiæ.
Erythræa	1	0	0	3	0	3	18	Per omnem orbem terrarum, nisi forte Africam australem.
Orthostemon	.....	.....	.....	.....	.....	1	2	Species altera Indica, altera Australiensis.
Pladera	1	0	0	1	2	2	2	In India cis-gangetica.
Canscora	2	4	1	1	7	9	9	Species omnes Indicæ; unica in Abyssinia vagans.
Heterocanscora	0	1	0	0	0	1	1	Species Indica.
Phyllocyclus	0	2	0	0	0	2	2	Species ambæ Indicæ.
Slevogtia	0	1	0	1	1	1	2	Species altera in orbe vetere, altera in orbe novo, tropicæ sparsæ.
Gentiana	0	5	34	3	1	36	153	In locis frigidioribus totius orbis terrarum.
Jæschkea	0	0	2	0	0	2	2	Species ambæ Indicæ.
Crawfurdia	0	2	3	0	1	5	6	Species unica in Japonia, cæteræ Indicæ.
Carried forward...	8	21	43	9	26	81	226	

TABLE II. (*continued*).

	Bengaliæ planities.	A Khasia ad Japan.	Himalaya.	Punjab et Scinde.	Peninsula cum Zeylania.	India.	Orbis terrarum.	
Brought forward	8	21	43	9	26	81	226	
Pleurogyne............	0	0	1	0	0	1	2	Species ambæ in Alpibus, unica in Arcticis, obviæ.
Ophelia	0	7	10	0	6	18	20	Species unica in Australia, unica in China, cæteræ Indicæ.
Halenia	0	0	1	0	1	2	15	Species 8 in Andibus, 5 in Arcticis, 2 Indicæ.
Swertia	0	0	8	0	0	8	14	Species 5 in Alpibus et Alatau, 1 in Arabia, 1 in Abyssinia.
Limnanthemum ...	4	4	0	3	5	6	12	Per omnem orbem terrarum sparsæ.
	12	32	63	12	38	116	289	

That is, out of an order containing 60 genera and 450 species, the Indian list contains 17 genera and 116 species.

Note on a Fruit from Comassi, collected by Lieut. DE HOGHTON and sent to Kew by Major BULGER. By Prof. OLIVER, F.R.S.

[Read April 16, 1874.]

BY a bit of exceptionally good fortune the solitary specimen of botanical interest brought us by the Ashanti expedition (a single fruit, the produce of a tall tree, gathered at Fomana, north of the Adansi Hills) proves to belong to an undescribed species of a remarkable genus of Tiliaceæ, *Duboscia*, only known to us previously from specimens collected on the river Muni by Mr. Gustav Mann in 1862, and described by M. Bocquillon in 'Adansonia' (vii. 50).

The new fruit is broadly ellipsoidal in form, depressed at each extremity, about 4½ inches long, marked longitudinally by about eight broadly rounded longitudinal ridges. The outer pericarp

is $\frac{1}{2}$ in. thick, strongly fibrous, externally invested by a thin, continuous, smooth and somewhat shining lemon-yellow rind. The inside of the fruit is filled with a fibrous endocarp, in which the seeds are more or less horizontally embedded, interrupted radially by about eight obscure dissepiments. A narrow ring of pale tenacious liber separates the outer strata of the pericarp from the inner. The seeds are exalate and albuminous.

In Mr. Mann's species (called, unfortunately, *Duboscia macrocarpa* by Bocquillon) the fruit is only about 2 inches long, and (in the dry specimen) marked by eight prominent longitudinal ridges. The seeds are embedded in a fibrous endocarp as in the Comassi plant.

Mr. Mann discovered a second nearly allied genus of Tiliaceæ in West Tropical Africa, with indehiscent fibrous fruit (*Desplatzia*, Bocq.), differing from *Duboscia* in the number of cells in the ovary (five), and winged seeds.

Additions to the Lichen-flora of New Zealand. By Dr. J. Stirton. Communicated by Dr. Hooker, C.B., Pres.R.S.

[Read May 7, 1874.]

The following are descriptions of lichens picked out of several bundles sent by Mr. John Buchanan, of the Colonial Museum, Wellington, N. Z., to whose enthusiasm and assiduity I can bear ample testimony.

There is every probability of my being able to supplement what is now given, as Mr. Buchanan is diligently prosecuting his researches towards the interior of the country, where the chances of success are greater, and where, too, disturbing causes are less at work. It ought also to be stated that several of the most characteristic species are in small quantity, as they have only been detected on barks &c. containing other lichens, for which these were more immediately sent, and, as a consequence, are confined to a few apothecia.

In the collections are some curious and anomalous species, whose generic place even it has been difficult to assign; and the difficulty has been enhanced from the fact that no well-defined limits have hitherto been given to the very genera in question, nasmuch as they are of recent creation and founded accordingly

on restricted bases, owing to the paucity of the species secured, and secured, too, only in particular localities. The whole question requires thorough revision, notwithstanding the able and devoted study of the subject by several well-known continental lichenologists. Whole tracts of the world's surface are still as a *terra incognita* in this respect; and even in countries such as New Zealand, to which the attention of several of the ablest botanists has been particularly directed, not more than passing glances have been bestowed in the direction of lichens.

In the *Angiocarpous* section there is a singular discrepancy between the colour of the spores of several from N. Z. and those accorded to them by authors. I have accordingly appended a description in each case. It is possible, that the diagnoses may have been made from scanty and imperfect specimens; and, on my part, it is quite likely that I am in possession of lichens differing specifically from any described; but, in the absence of specimens for purposes of comparison I have preferred to identify several with those whose descriptions are given, rather than create confusion by increasing synonyms. A much more extended series of specimens will be necessary to decide the transitions through which any one species may pass, or, on the other hand, to define the limits within which such variations are confined—in other words, to pronounce what are mere varieties and what constitute specific differences.

It is curious that the diversity of the N. Z. phanerogamic flora should find a parallel in its lichen flora. No country from which I have received lichens equals this, either in the richness or variety of its species. It is true that several genera are meagrely represented; but the number is large considering the extent of country, and scarcely a packet arrives from my assiduous correspondent in which I am not surprised as well as delighted with the sight of some new and extraordinary form.

To the student in the northern hemisphere, the botany of Australasia has peculiar attractions, inasmuch as it may be said to belong to a preceding geological epoch; and it is curious to notice that while the phanerogamic part of it diverges widely from that of countries in a corresponding European latitude, its cryptogamic part shows closer affinities, and the more so as we approach the lichens, whose powers of resisting natural atmospheric changes and conditions are becoming a subject of closer study in proportion as our knowledge of their structure and in-

ternal organization advances. If we are ever to arrive at any thing like a general comprehension of the spread and distribution of vegetation over the surface of the earth, I have little doubt that a thorough appreciation of climatic changes on the lower organisms will serve to indicate the movements of the larger waves, so to speak; and as these are the first to reveal themselves, I hold that this part of the scale ought to have more attention paid to it than has hitherto been the case.

The present attempt will have served its purpose if it merely provokes discussion of this difficult yet interesting section of Botany.

BÆOMYCES GRANOSUS, sp. nov.

Thallus (K rubescens) albidus vel cinereo-albidus, sæpe plus minus rubro tinctus, minute granulosus vel fere leprosus, irregularis; apothecia (K nigricanti-purpurascentia) rufo-rubricosa, magna, dilatata, plana vel nonnihil convexa, intus rufescentia, margine pallidiore lævi cincta, paraphysibus et hypothecio granulis conglomeratis rufulis inspersis; sporæ 8næ, incolores, simplices, oblongo-ellipsoideæ (·0085 × ·004 millim.); paraphyses irregulares, sæpe paulo ramosæ. Gelatina hymenialis iodo non tincta.

Ad rupes prope Wellington.

BÆOMYCES ARCUATUS, sp. nov.

Thallus albidus vel pallide cinereus, crassus, minute granulosus vel fere subleprosus (K –, C –), gonidiis in glomerulis extus prominulis adspersus; apothecia (K –) testacea, claviformia, immarginata, longitudinaliter plicata, intus incoloria, stipite tenui fere tereti *arcuato* longo (long. 12 millim. et ultra); sporæ 8næ, simplices, incolores, fusiformes (·012–·014 × ·0028–·003 millim.); paraphyses satis bene discretæ. Gelatina hymenialis iodo leviter cærulescens, demum viridi-flavescens.

Supra terram muscosam prope Wellington.

BÆOMYCES SUBGRANOSUS, sp. nov.

Similis *B. granoso*, sed apotheciis (K –) fere sessilibus pallidioribus, intus incoloribus, et sporis angustioribus (·0085 × ·0032 millim.).

Ad rupes prope Wellington.

Forsitan nonnisi varietas *B. heteromorphi* (Nyl.).

BÆOMYCES PERTENUIS, sp. nov.

Thallus vix ullus; apothecia testacea, sessilia vel interdum substipitata, ambitu libera, nec nisi medio adnata, concava, margine pallidiore cincta; sporæ 8næ, incolores, fusiformes, perminutæ (circa ·0065 × ·002 millim.), simplices vel interdum septum obsoletum indicantes,

uniseriatæ in thecis quæ vix (quoad crassitiem) a paraphysibus differunt.

Ad truncos arborum, forsitan cujusdam *Cyatheæ*.

STICTA HIRTA, sp. nov.

Thallus pallide flavidus, late expansus, late rotundato-lobatus, glomerulis cephalodinis densis elevatis frequentissime obtectus et fere occultus, subtus fusco-niger dense tomentosus; apothecia fusco-nigra vel nigra, margine thallino ex isidiis densis radiantibus composito, quæ sæpissime fere epithecium obtegunt; sporæ ut in *Stictæ Urvillei* var. *Colensoi*.

Ad cortices, Wellington.

Notwithstanding the varied forms assumed by *S. Urvillei*, I have been tempted to elevate this into the rank of a species, as it is rather widely separated from the other varieties received.

PSOROMA IMPLEXUM, sp. nov.

Thallus pallido-luridus vel cervinus, continuus, extus laciniis anguste multifidis planis apice obtusis haud raro pulverulentis obtectus, subtus albidus tomentosus, ad corticem rhizinis densis crassis ramosis nigris implexis arcte adfixus, quæ longe ultra thallum se extendunt; apothecia elevato-sessilia, mediocria, badio-rufa, margine thallino inflexo profunde inciso cincta, qui in statu juvenili discum fere occultat; sporæ 8næ, simplices, incolores, ellipsoideæ, uno alterove apice nonnihil attenuatæ, episporio duplici crenulato (·018–·024 × ·009 millim.); paraphyses non bene discretæ; hypothecium leviter fuscescens. Gelatina hymenialis iodo cærulescens, dein obscurata.

Ad cortices prope Wellington.

Affine *P. sphinctrino*, sed distinctum.

PSOROMA ATHROOPHYLLUM, sp. nov.

Thallus pallide fuscescens vel cervinus, subtus crassus continuus nigrofuscus et rugosus, extus multifido-laciniatus, laciniis arcte imbricatis adscendentibus latis rotundato-crenatis, subtus nonnihil pallidioribus; apothecia magna, rufa, rugosa, marginibus elevatis granuloso-concretis, intus succinea; sporæ 8næ, incolores, fere sphæricæ (·012×·014 millim.), crenulatæ, uniseriatæ; paraphyses haud discretæ. Gelatina hymenialis iodo cærulescens. Gonidia parva, ·0065 millim.

Ad corticem, Wellington.

PANNARIA VARIEGATA, sp. nov.

Thallus pallide cervinus, squamulosus, squamulis minutis crenulatis creberrimis; apothecia biatorina, majuscula, sessilia, plana, rufa, margine pallidiore lævi prominulo cincta; sporæ 8næ, simplices, incolores, (·014 – ·018 × ·007 – ·0095 millim.); paraphyses discretæ, apicibus rufulis; hypothecium pallidum. Hypothallus nigro-cærulescens,

byssoideus. Granula gonima cærulescentia, agglomerata. Gelatina hymenialis iodo cærulescens, dein in medio vinose rubens, extremis persistenter cærulee tinctis.

Ad corticem, Wellington.

Affinis *P. microphylloidi* (Nyl.), sed distincta.

PANNARIA PERFOSSA, sp. nov.

Thallus livido-glaucescens, squamulosus, squamulis compactis vel imbricatis crenatis vel lobulatis, hypothallo nigricanti nonnihil fibroso adfixus et limitatus; apothecia badio-rufa, plana, plerumque in medio pertusa, margine thallino crenato, demum crispato-contorto cincta, intus concoloria et succineo-flava; sporæ 8næ, simplices, incolores, ellipsoideæ (·012–·014 × ·007–·0085 millim.). Pars media hymenii iodo cærulescens, cæteris non tinctis.

Ad corticem prope Wellington.

Facie externa similis fere *Ps. sphinctrino*, sed ab eo facile distincta granulis gonimis &c.

PANNARIA CRUSTATA, sp. nov.

Thallus obscure olivaceus, squamuloso-crustaceus, areolato-diffractus, squamulis majusculis rugosis rotundatis, margine recurvis et crenulatis; hypothallus niger, conspicuus; apothecia badio-rufa, mediocria, plana vel nonnihil convexa, excipulo proprio tenui et margine thallino prominulo crenulato, sæpe a priore facile separando, cincta, intus pallida; sporæ 8næ, simplices, incolores, ellipsoideæ, frequenter utroque apice acuminato-attenuatæ, marginibus distincte crenulatæ (·017–·02 × ·009–·011 millim.); paraphyses discretæ, apicibus fusco rufis dense conglutinatis. Gelatina hymenialis iodo leviter cærulescens, dein vinose rubescens, apicibus paraphysium non tinctis.

Ad saxa, Wellington.

Affinis *P. pholidotæ*, sed distincta.

SQUAMARIA THAUMASTA, sp. nov.

Thallus (K –, C erythrinose reagens reactione fugaci) cinereo-albidus, tessellato-areolatus, squamas polygonias *umbonatas* distinctas sistens, et sparsa supra thallum magis evolutum cephalodia majuscula prominula carneo-rufescentia rimose radiata conspiciuntur; apothecia parva, elevato-sessilia, concava, rugosa, fusco-rufa, margine thallino prominulo lævi inflexo cincta; sporæ 8næ, simplices, incolores, late ellipsoideæ, uniseriatæ (·012 × ·0085 millim.). Granula gonima (·01 millim.) glauco-virescentia, glomerata, pellucida, non granulosa. Gelatina hymenialis iodo violacee, dein cærulee tincta.

Supra saxa prope Wellington.

LECANORA CHRYSOSTICTA (*Taylor*)

is mentioned for the purpose of recording the fact of its

growing along with *Lecidea fuscolutea* (Dicks.) on the bark of the same tree. As regards their internal organization, the two lichens are identical; and it is only when the thalline margin of the former is considered, that the question of generic distinction is forced upon the attention. Their chemical reactions are also identical, and, as showing still further the close organic affinity between the two, there are seen, scattered over the thallus of the latter, spermogonia without the thalline margin, while over that of the former are seen the same with an elevated thalline margin, both having otherwise the same appearance and organization as well as chemical reaction. I may have another opportunity of returning to this subject, which is beginning to interest me, inasmuch as I can point to other instances having similar associations.

Lecanora vallata, sp. nov.

Thallus (K –, C –) albo-cinereus, tenuis, leviter rimuloso-areolatus; apothecia pallido-fusca vel fusco-atra, urceolata, minuta (lat. ·16 millim.), excipulo pallido integro innato-sessili cincta; sporæ 8næ, incolores, 1–3-septatæ, fusiformes, utroque apice obtusiusculæ, sæpe curvatæ (·016–·032 × ·0047 millim.); paraphyses distinctæ, capillares, apicibus clavatis incoloribus vel fere incoloribus; hypothecium incolor. Gelatina hymenialis iodo cærulescens.

Ad corticem, Wellington.

In the absence of spermogonia I cannot reconcile myself to classifying this lichen with the *Lecideæ*, more especially as there have almost always been detected gonidia in thin sections of the apothecia.

Lecanora flavopallida, sp. nov.

Thallus flavescens, tenuis, granulosus; apothecia sessilia, fusco-pallescentia, interdum pruinosa, plana vel leviter convexa, mediocria, margine pallido; sporæ 8næ, simplices, incolores, membrana duplici hyalina cinctæ (intervallo rufo microscopice examinato), ellipsoideæ (·02–·028 × ·01–·014 millim.); paraphyses confertæ, non bene distinctæ, apicibus rufo-fuscis adglutinatis et granulis interspersis: hypothecium incolor. Gelatina hymenialis iodo intense cærulescens.

Flavescentia thalli K effecta, addito C, rufo-purpurascenti persistenti permutatur; C adhibitum per se ad thallum et marginem thallinum, reactionem aurantiacam efficit.

Ad cortices, Wellington.

Lecanora inclinans, sp. nov.

Thallus albus vel albidus, tenuis, rimuloso-areolatus; apothecia parva,

sessilia flava, excipulo thallino integro cincta; sporæ 8næ, incolores, polari-biloculares (loculis tubulo longo angusto junctis), longit. ·012, latit. ·009 millim.; paraphyses haud discretæ, apicibus fusco-aurantiacis; hypothecium incolor. Thallus æque ut epithecium K –, C –.

Ad cortices, Wellington.

Forte nimis arcte accedit ad *L. camptidiam* (Tuck.).

PERTUSARIA CIRCUMCINCTA, sp. nov.

Thallus (K –, C –) albidus vel cinereo-albidus, crassus, granuloso-congestus, nonnihil farinosus; apothecia primo fere occlusa, demum lecanoroidea (latit. 1·5 millim. et ultra), concava, fusca, albo-pruinosa, marginibus prominulis laceratis vel tuberculosis cincta; thecæ monosporæ. Sporæ simplices, oblongæ, incolores (·13 × ·034 millim.), in thecis quibus paries externus est crassus papillosus et ex opere reticulato compositus cellulas elongatas tortuosas et granuloso-inspersas sistente, in quo etiam paraphyses paucæ filiformes irretiuntur. Gonidia magna, flavido-virescentia. Gelatina hymenialis thecarum iodo intense cærulescens, fere nigra.

Ad corticem, Wellington.

PHLYCTIS OLEOSA, sp. nov.

Thallus albidus, lævis, areolato-diffractus, areolis concavis margine recurvis (K flavens dein erythrinose aurantiacus); apothecia sparsa vel frequentius aggregata, parva, depressa, rufo-cervina, ochraceo-pruinosa, marginibus dentatis inflexis cincta; sporæ 4–8næ, incolores, 7-septatæ (septis sæpissime undulatis), cylindraceo-ellipsoideæ (·08 × ·018 millim.), curvatæ, in thecis incrassatis una cum guttulis flavidis oleosis inclusæ; paraphyses discretæ, apicibus rufulis cohærentibus. Gelatina hymenialis modo thecas ambiens, iodo cærulescens.

Ad truncos arborum, Wellington.

PHLYCTIS UNCINATA, sp. nov.

Thallus albidus vel albido-canescens, tenuis, rugosus, effusus, leprosus vel farinosus; apothecia minuta, irregularia, depressa, sparsa vel aggregata, fusca, albido-pruinosa, margine thallino leproso inflexo irregulariter crenulato cincta; sporæ 4–8næ, incolores, fusiformes, apicibus acutis, crescenticæ 7-septatæ et in thecis una cum liquore flavido oleoso sæpissime involutæ (·08–·1 × ·008–·01 millim.). Thallus K flavido, dein mox rubro tinctus.

Ad corticem, Wellington.

PHLYCTIS SUBUNCINATA, sp. nov.

Similis præcedenti, sed sporis tenuioribus, brevioribus (·065–·08 × ·005–·0065 millim.). Thallus K leviter flavescens sed sine reactione erythrinosa subsequente; adhuc in thecis liquidum oleosum non visum.

Ad corticem, Wellington.

Tremotylium occultum, sp. nov.

Thallus (K –, C –) cinereo-albidus vel cinereus, rimoso-areolatus; apothecia innata vel potius depressa et urceolata, fusca, nonnihil concava, oblonga vel varie elongata et radiata, marginibus thallinis crassis prominulis cincta et sæpissime occulta (quare thallo est aspectus cerebriformis vel convolutus); thecæ monosporæ; sporæ leviter fuscescentes, ellipsoideæ, murali-loculares (·06–·08 × ·032 millim.); paraphyses non bene discretæ, apicibus fuscis conglutinatis; hypothecium incolor. Gelatina hymenialis iodo intense cærulescens.

Ad corticem, Wellington.

Tremotylium subocultum, sp. nov.

Thallus albidus, crassus (K –, C –); apothecia fusca, rotundata oblonga vel in seriebus tortuosis linearibus aggregata, verrucis thallinis elevatis epithecium fere occultantibus sed non excipulis propriis cincta; thecæ monosporæ; sporæ fuscæ vel fusco-nigræ, ellipsoideæ, murali-reticulatæ (·18–·24 × ·08–·1 millim); paraphyses discretæ, tenues, frequenter anastomosantes. Gelatina hymenialis iodo intense cærulescens.

Ad corticem, Wellington.

I have been constrained to separate these two lichens, as the differences indicated above are constant. In the latter the spores are so large in proportion to the depth of the hymenium that the slightest pressure between two slips of glass serves to disperse them; and, in many cases, by the aid of a Codington lens, they may be seen scattered in the chinks formed by the thalline borders.

Thelotrema obovatum, sp. nov.

Thallus pallidus vel pallide flavescens (K flavens), rimulosus, inæqualis, leviter nodulosus; apothecia hemisphærica, prominula, sparsa vel aggregata, ostiolis rotundatis apertis, margine thallino crasso lævigato, proprio lacerato inflexo, epithecio urceolato scutelliformi fusco; sporæ 8næ, incolores, obovatæ, uno apice extenuato-acuminatæ, altero late oblongo-rotundatæ, 15–20-loculares (·09–·12 × ·017–·02 millim.). Episporium belle crenulatum et iodo cærulee tinctum.

Ad truncos arborum, Wellington.

Thelotrema hians, sp. nov.

Thallus flavescens vel flavescenti-fuscus, tenuis, lævis, minute rimuloso-areolatus (K flavens, dein purpurascens); apothecia parva, leviter vel vix prominula, ostiolo aperto, margine thallino lævigato, proprio albido, epithecio fusco; sporæ 8næ, incolores, obovatæ, sicut in præcedente, fere constanter 10-loculares (·06–·08 × ·012–·014 millim.). Episporium crenulatum.

Ad truncos arborum, Wellington.

The differences, as indicated above, between the two *Thelotremata* are constant throughout an extensive series of specimens. The reaction of K on the thallus, in the case of the latter, was purple, in one instance, only on the thalline covering of the apothecia, while in all the other specimens this reaction manifested itself generally over the rest of the thallus.

Odontotrema concentricum, sp. nov.

Thallus albicans, tenuis, fere continuus (K –, C –); apothecia in verrucis prominulis, primum occlusa, dein fissuris thalli denticulatis dehiscentia; epithecium albo-farinosum, planum, irregulare, pulvereo suffusum, duobus annulis concentricis fusco-nigris, plus minus completis circumcinctum; sporæ 1–8næ, incolores, multiloculares, longitudine variantes, minimis 4–6-locularibus (·04 × ·007 millim.), maximis fere cylindricis, apicibus obtusis, 18–20-locularibus (·16 × ·013 millim.); paraphyses numerosæ, discretæ, capillares, apicibus incoloribus; hypothecium densum, fusco-nigrum.

Iodo reactio nulla vel flavescens.

Ad corticem, Wellington.

This lichen is placed provisionally in the genus *Odontotrema*, as the specimen in hand merely comprises a few apothecia, and the different stages of their growth and development can only be guessed, much less adequately ascertained. The ultimate appearance assumed by them is certainly unlike that of the only other species of this unique genus in my possession. The internal organization of the plant presents an evident affinity to the *Thelotremata*. The spermogonia are small, black, and rugose on the surface, with curved cylindrical spermatia (·006 × ·002 millim.), on short arthrosterigmata.

Ascidium elatius, sp. nov.

Thallus pallido-stramineus (K flavens), crassus, lævis, nodulosus: apothecia majuscula, nigra, in verrucis thallinis hemisphæricis prominulis, in parte superiore crassis (latit. ·2 millim.) innata, sphærica vel potius ampullacea, epithecio nigro depresso plano; thecæ monosporæ; sporæ elongato-ellipsoideæ (·20–·32 × ·07–·09 millim.), fusco-nigræ vel nigræ, muralidivisæ, halone pellucida gelatinosa involutæ; paraphyses nullæ vel in stroma irregulare fibrosum degenerantes. Iodo nulla reactio.

Ad ramulos arborum, Wellington.

Lecidea implicata, sp. nov.

Thallus albidus, lævis, tenuis, rimulosus (K –, C –); apothecia (K –) majuscula, sessilia, plana vel nonnihil convexa, pallide cervina, pruinosa,

rugosa, margine lævi prominulo nonnihil inflexo cincta; paraphyses discretæ, filiformes, ramosæ, dense et omnino implicatæ, thecas in reti fibroso includentibus; hypothecium et epithecium fuscescentia; sporæ 8næ, simplices, incolores, ellipsoideæ, crasse granulosæ (·045–·06 × ·028–·032 millim.).

Ad truncos arborum, Wellington, alt. 500 metr.

This lichen has a proper margin; and as the apothecium is attached by a broad central base, the thalline receptacle is seen covering it and the unattached portion, but ceases considerably below the proper margin.

LECIDEA KELICA, sp. nov.

Thallus cinereo-albidus, tenuis, minute rimuloso-areolatus, areolis lævibus planis vel nonnihil convexis (K –, C –); apothecia (K rubescentia) citrina (provectioribus parte vel toto ad nigrum mergentibus), leviter convexa, immarginata, sæpissime aggregata et tunc difformia; hypothecium pallidum; sporæ 8næ, rectæ vel curvatæ, incolores, elongato-ellipsoideæ, fere subcylindraceæ, 1-septatæ (·012–·018 × ·0045 millim.); paraphyses non bene discretæ, apicibus aurantiacis.

Ad corticem, Wellington.

This lichen is peculiar in having attached to the hypothecium, or, indeed, forming part of it, little cushions composed of masses of minute greenish granules, so that a microscopic preparation capable of showing the thecæ and spores has, to the naked eye, a bright lemon-colour throughout.

LECIDEA CAMPYLOSPORA, sp. nov.

Thallus albidus vel cinereo-albidus, tenuis, continuus aut rimuloso-areolatus, areolis planis vel convexis et granulosis; apothecia nigra, elevato-sessilia, juniora concava vel etiam coarctata, dein ampliata expansa plana vel convexiuscula, cæsio-pruinosa, marginibus crassis prominulis inflexis; sporæ 4–6næ, incolores, in medio curvatæ vel fere geniculatæ, 1-septatæ, loculis sæpissime nucleatis (·05–·075 × ·026–·035 millim.), episporio crenulato; paraphyses creberrimæ capillares, apicibus fusco-rufis; hypothecium pallide luteum, excipulo nigro denso subtensum. Gelatina modo thecas ambiens, iodo cærulee tincta.

Ad cortices, præcipue vetustos, prope Wellington frequens, alt. 400 metrorum.

Forte nonnisi var. insignis *L. versicoloris* (Fée).

LECIDEA FUSCOLUTEA (*Dicks.*).

Ad corticem arborum prope Wellington, alt. 500 metr.

The chemical reactions are identical; viz. K, thallus yellow, apothecia crimson. The hypothecium is darker than in specimens from Ben Lawers.

LECIDEA DENIGRATA, (*Nyl.*) *Lich. Scand.* p. 202.

Is identical with what on a former occasion was named *L. amaura*, as the differences are not constant.

Ad ligna cæsa, Wellington.

LECIDEA RIVULOSA (*Ach.*).

So far as I am aware, this is the first notice of this common lichen having been found in New Zealand.

LECIDEA CERATINA, sp. nov.

Thallus albido-cinereus, crassiusculus, rugosus vel tuberculosus, diffracto-rimoso-areolatus; apothecia fusco-rufa vel fusco-nigra, sessilia, excipulo integro corneo fere humori impervio facileque a thalamio sejuncto cincta; sporæ elongato-aciculares, nonnihil bacilliformes, multiseptatæ, septis haud distinctis (·076 × ·0025 millim.); paraphyses tenues, discretæ, apicibus fusco-nigris crassulis; hypothecium tenue, rufescens, excipulo crasso corneo succineo subtensum. Gelatina hymenialis iodo intense cærulescens, dein vinose rubescens e glauco-viridi, ea thecarum flavens.

Ad cortices prope Wellington.

Arcte affinis est *L. arceutinæ* (Ach.), sed variis notis distincta, ut excipulo corneo &c.

LECIDEA RUBRICATULA, sp. nov.

Thallus pallescenti-albidus vel griseo-pallescens, crassus, diffracto-areolatus, areolis planis vel convexiusculis læviusculis, sed puncta numerosa minuta ostendentibus; apothecia majuscula, rufo-rubricosa, intus rubricantia, sessilia, plana, marginibus prominulis cincta (K nigro-purpurascentia); sporæ 8næ, simplices, incolores, ellipsoideæ (·018–·024 × ·009–·016 millim.); paraphyses discretæ, capillares, granulis inspersæ, apicibus rufulis conglutinatis; hypothecium rufulum. Gelatina hymenialis iodo intense et persistenter cærulescens, apicibus paraphysium non tinctis.

Ad cortices, Wellington.

LECIDEA EPIPHYSA, sp. nov.

Parasitica supra thallum *Arthoniæ perangustæ*. Apothecia minuta, convexa, fere hemisphærica, immarginata, pallido-flavescentia, dein fusca vel fusco-nigra, intus incoloria; thecæ saccatæ, polysporæ; sporæ sphæricæ, incolores (circa ·002 millim.); paraphyses sparsæ, discretæ, filiformes, irregulares, apicibus fere incoloribus adglutinatis et granuloso inspersis; hypothecium rufulum. Gelatina hymenialis iodo cærulescens, dein fere nigra.

Ad cortices, Wellington.

Affinis *L. improvisæ* (Nyl.).

LECIDEA ALEUROIDES, sp. nov.

Thallus (K –, C –) flavido-cervinus, squamulosus, squamulis parvis arcte appositis vel imbricatis, marginibus pallidioribus crenulatis; hypothallus niger, e fibrillis byssoideis dense compactis compositus; apothecia sessilia, magna, plana vel convexiuscula, marginata, pruinosa, rufulo-fusca; sporæ 8næ, simplices, incolores, ellipsoideæ vel fusiformi-ellipsoideæ (·01–·012 × ·0045–·006 millim.); paraphyses haud discretæ, apicibus crassatis purpurascentibus; hypothecium pallido-fuscum. Gonidia majuscula, flavescentia. Gelatina hymenialis iodo cærulescens, dein vinose rubens.

Ad cortices vetustos, Wellington.

LECIDEA NUBILIOR, sp. nov.

Thallus albido-cinereus, farinosus, minute rimoso-areolatus, rugulosus; apothecia sessilia, concava, fuscescentia, albo-farinosa, marginata; sporæ 8næ, incolores, cylindricæ, plerumque leviter incurvæ, 3–5-septatæ, septis valde indistinctis (·06 × ·004 millim.); paraphyses irregulares, articulatæ et interdum ramosæ, indistinctæ; hypothecium incolor. Gelatina hymenialis iodo vix vel obsoletissime cærulescens.

Ad cortices vetustos, Wellington.

LECIDEA NIDULANS, sp. nov.

Thallus tenuis, albus, fere continuus; apothecia primo coarctata parva, dein expansa, plana, marginata, fusco-nigra, humecta translucida; sporæ 8næ, fuscæ, elongato-ellipsoideæ, 3–5-septatæ, plerumque leviter incurvæ (·012–·025 × ·005–·006 millim.); paraphyses adglutinatæ, etiamque apices incolores; hypothecium tenue, subrufulum.

Ad folia *Dicrani Menziesii*.

Affinis *L. persimili* (Nyl.).

LECIDEA CONCINNIOR, sp. nov.

Thallus cinereo-rufescens, granuloso-concretus; apothecia mediocria, fusca, pellucida, subinnata, nonnihil undulata, intus fuscescentia; sporæ 8næ, fusiformi-aciculares, rectæ et in thecis inter se parallelæ, incolores, apicibus obtusiusculis, 6–18-septatæ, septis haud bene distinctis (·065–·1 × ·004 millim.); paraphyses haud bene distinctæ, apicibus fuscis; hypothecium fusco-nigrum; paraphyses et thecæ iodo leviter rubescentes; hypothecium leviter cærulescens.

Ad corticem prope Wellington.

LECIDEA WELLINGTONII, sp. nov.

Thallus albidus, tenuis, diffracto-rimoso-areolatus; apothecia nigra, sessilia, plana vel convexiuscula, mediocria, margine pallido-cervino demum excluso; sporæ 8næ, incolores, 12–18-septatæ (septis sæpissime indistinctis), bacilliformes, utroque apice obtusæ, curvatæ vel potius spiræ instar contortæ etiamque in thecis implexæ (·08–·12 × ·0045 millim.); paraphyses discretæ, apicibus livido-nigris incrassatis;

hypothecium fere incolor. Gelatina hymenialis iodo intense cærulescens, dein vinose obscurata.

Ad cortices, Wellington.

Forsitan forma *L. millegranæ* (Tayl.).

LECIDEA FUSCOCINCTA, sp. nov.

Thallus (K –, C –) tenuis, albescens vel pallido-fuscescens, continuus, nonnihil rugosus; apothecia fusca, translucida, primo coarctata et margine prominulo fusco-nigro cincta, ultimo convexa et immarginata; sporæ 8næ, simplices, incolores, ellipsoideæ (·01–·014 × ·008 millim.); paraphyses haud discretæ; hypothecium, thalamium et epithecium incoloria. Gelatina hymenialis iodo cærulescens, dein flavescenti-fusca.

Ad ramulos arborum, Wellington.

LECIDEA MACULOSA, sp. nov.

Thallus cinereo-albidus, tenuis, leviter rimulosus, nonnihil rugulosus, determinatus (K flavens, C flavens); hypothallus niger; apothecia nigra, sessilia, mediocria, plana, sparsa vel confluentia, margine prominulo undulato cincta; sporæ 8næ, incolores, ellipsoideæ, sæpissime curvatæ, 1-septatæ (·016 × ·007 millim.); paraphyses non bene discretæ, apicibus nigris multum ampliatis et clavatis; hypothecium rufulo-fuscum (strato intermedio pallido), excipulo nigro integro subtensum. Gelatina hymenialis iodo vinose rubens (præcedente cærulescentia levi vel nulla).

Ad cortices, Wellington.

LECIDEA INSIDENS, sp. nov.

Thallus albidus, lævis, continuus; apothecia elevato-sessilia, axi centrali adfixa, fusca, plana, rugosa, marginibus lævibus prominulis concoloribus cincta; hypothecium rufescens; sporæ 8næ, incolores, sphæricæ, murali-loculares (·012–·02 millim.); paraphyses discretæ, apicibus fuscescentibus clavatis.

Ad folia *Dicrani Menziesii* prope Wellington.

The spores of this curious lichen are muralilocular, and not merely coarsely granular, while their outline, when free, is in the great majority of cases circular, although a few may be seen somewhat oblong.

ARTHONIA PERANGUSTA, sp. nov.

Thallus cinereus, tenuis, lævis, rimuloso-areolatus; apothecia innata, fuscescenti-nigra, parva, rotundata vel oblonga, nonnihil irregularia, intus fuscescentia; sporæ plerumque 8næ, interdum 10næ et ultra, uniseriatæ, simplices, incolores, perminutæ et sphæricæ (circa ·002 millim.); paraphyses nullæ. Gelatina hymenialis iodo non tincta.

Ad corticem, Wellington.

A remarkable lichen. A thin section presents masses of thecæ, which at first sight might be mistaken for paraphyses having a

somewhat beaded appearance; a higher power reveals the spores, which towards the apex are distinct and separate, and in many instances may be seen extruded, while towards the base they are in close contact.

MELASPILEA AMPHORODES, sp. nov.

Thallus cinereo-albidus vel cinereus, rimulosus, tenuis; apothecia rotundata, parva, nigra, elevato-sessilia, juniora plana lævia tenuiter marginata, dein convexa rugosa immarginata; hypothecium fuscescens; paraphyses distinctæ, numerosæ, filiformes, apicibus clavatis fuscis dense et intricate implexis; thecæ pyriformes, infra attenuatæ et facile segregatæ, parietibus crassis; sporæ 4–8næ, oblongo-cylindraceæ, uno apice sæpe attenuatæ, multiseptatæ et adhuc septulis sensu longitudinali divisæ, filamentis tenuibus e lateribus et apicibus nascentibus. Gelatina hymenialis hypothecii et ea intra thecas iodo vinose rubentes; cæteroquin nulla reactio.

Ad cortices prope Wellington.

It is difficult to assign the generic place of this curious and interesting lichen. The genus under which it has been placed answers best; but the definition as given by Nylander must be extended in order to embrace it, especially as regards the spores and spermatia, the latter being oval and ·002 × ·0015 millim. I feel inclined to constitute it the type of a new genus under the name of *Melampilidium*.

On several pieces of bark have been detected minute patches of species belonging to the genus *Chiodecton* rather than to *Platygrapha*, as the hypothecium is very often continuous for several of the minute adjacent apothecia, which are quite invisible to the naked eye, and do not average more than ·09 millim. in diameter. Hitherto not much time has been devoted to their determination, owing chiefly to the scanty supply; meanwhile, however, three forms are evident:—

CHIODECTON CONCHYLIATUM, sp. nov.

Thallus cinereo-violaceus; apothecia fusca, rotundata vel oblonga, perminuta, discreta, in verruculis stromaticis albis aggregata; hypothecium nigrofuscum; sporæ 8næ, incolores, cylindraceæ, vel nonnihil bacilliformes curvatæ, 3-septatæ (·06–·08 × ·0025 millim.). Gelatina hymenialis iodo primum cærulescens, ea thecarum flavescens, dein thecarum et partis mediæ hymenii vinose rubentes, apicibus paraphysium persistenter cærulee tinctis.

Ad corticem, Wellington.

It is possible that this is *Platygraphis inconspicua* (Knight

and Mitten), on the supposition that there is a typographical error in the figures indicating the size of the spores.

CHIODECTON MONILIATUM, sp. nov.

Thallus flavido-fuscus, rugosus, hypothallo nigro marginatus; apothecia nigra, innata, perminuta, rotundata vel oblonga, discreta vel concatenata, marginibus thallinis circumscissis cincta, hypotheciis confluentibus fuscis; sporæ 8næ, incolores, curvatæ, 3-septatæ, cylindraceæ (·05–·06×·0025 millim.); paraphyses discretæ. Gelatina hymenialis iodo cærulescens, ea thecarum flavescens, dein partis mediæ hymenii fulvescens.

Ad corticem, Wellington.

CHIODECTON SINUOSUM, sp. nov.

Thallus albus, rimoso-areolatus, nigricantilimitatus; apothecia in striis depressis thallo cætero concoloribus innata, nigra, perminuta, rotundato-discreta, concatenata vel sæpe in seriebus tortuosis continuis disposita; sporæ 8næ, incolores (ut in præcedente); paraphyses discretæ; hypothecium fulvescens, tenue. Gelatina hymenialis iodo cærulescens, ea thecarum flavescens vel interdum fulvescens.

Ad corticem, Wellington.

VERRUCARIA BELONIZA, sp. nov.

Thallus obscurus, interdum macula flavescente indicatus; apothecia discreta, majuscula, nigra, prominula, demum rugulosa, ostiolo poriformi nonnihil irregulari, perithecio tenui sphærico; sporæ 4–8næ, incolores, simplices, rectæ, aciculares (·1–·16×·005 millim.); paraphyses longæ, irregulares, interdum ramosæ. Gel. hym. iodo non tincta.

Ad corticem vetustum, Wellington.

No indications of septa to the spores have been detected, although several apothecia have been examined; and in this respect the lichen is somewhat anomalous.

VERRUCARIA LEPTIZA, sp. nov.

Thallus niger, tenuis, minute sed distincte rimoso-areolatus; apothecia nigra, perminuta (·02 millim.), prominula, hemisphærica, perithecio dimidiato; thecæ saccatæ, sporis 8nis incoloribus elongato-ellipsoideis 1-septatis (·012–·015×·004 millim.); paraphyses nullæ.

Ad corticem, Wellington.

VERRUCARIA CYRTOSPORA, sp. nov.

Thallus albus, lævis, tenuis; apothecia nigra, minuta, prominula, perithecio integro subsphærico; sporæ 8næ, fuscæ, fusiformes, attenuatæ, curvatæ, 4–8-loculares, loculis rectangularibus (·03×·0045 millim.); paraphyses longæ, filiformes, interdum ramosæ.

Ad corticem simul cum *V. glabrata*, Wellington.

Verrucaria micromma (*Mont.*), *Nyl. Pyrenoc.* p. 49.

Spermogonia prominula, nigra, spermatiis acicularibus curvatis, longit. ·012 millim.

Ad corticem, Wellington.

In the New-Zealand specimens the spores are colourless in nearly every instance; and only in a few is a faint tinge of brown shown.

Verrucaria subtrahens, *Nyl. in Flora*, 1866, p. 135.

Ad corticem lævem, Wellington.

Thelenella Wellingtonii, sp. nov.

Thallus (K flavens) pallide cervinus, crassiusculus, continuus, lævis; apothecia majuscula, immersa, perithecio integro incolori sphærico, ostiolo depresso fusco poriformi; sporæ 8næ, incolores, late fusiformes, utroque apice acuminato-attenuatæ, muralidivisæ (·07–·11 × ·02–·03 millim.), episporio duplici hyalino crasso; paraphyses discretæ, filiformes, numerosæ. Iodo gelatina hymenialis episporii modo cærulescens.

Ad cortices arborum, Wellington.

Species insignis et maxime distincta.

Trypethelium erumpens (*Fée*).

Thallus tenuis, continuus, cinereo- vel pallide fuscescens, indeterminatus; apothecia in stromatibus fusco-nigris leviter prominulis mediocribus (plerumque singulum, interdum duo in quavis verruca); sporæ 8næ, fuscæ, ellipsoideæ, 4-loculares (·024 × ·012 millim.); paraphyses haud discretæ, guttulis oleosis interspersæ etiamque repletæ. Iodo nulla reactio.

Ad corticem, Wellington.

Trypethelium Cumingii (*Mont.*).

Thallus albidus vel flavescens, lævis (K aurantiaco-flavens); sporæ 8næ, incolores, demum fuscæ (·06–·08 × ·022–·03 millim.); paraphyses filiformes, numerosæ, guttulis oleosis repletæ. Gelatina hymenialis iodo vinose fulvescens.

Ad corticem, Wellington.

Trypethelium connivens (*Nyl.*).

Sporis incoloribus, demum fusco-nigris et ostiolis aurantiacis.

Ad corticem, Wellington.

Astrothelium prostratum, sp. nov.

Thallus satis bene evolutus, continuus vel leviter rimulosus, tenuis, pallide flavescens vel cinereo-pallidus; apothecia in verrucis vix prominulis nigris obtectis demum denudatis (latit. ·5–1·75 millim.) inclusa, peritheciis nigris, ostiolis planiusculis, pulvere ochraceo-ferrugineo suffusis; sporæ 8næ, uniseriatæ, oblongæ, incolores, demum fuscæ 6-

loculares, sæpe loculis duobus in mediis seriebus transversis (·04–·05 × ·014–·02 millim.); paraphyses copiosæ, filiformes. Gelatina hymenialis iodo vinose rubens.

Ad cortices, Wellington.

On the Discovery of *Phylica arborea*, Thouars, a tree of Tristan d'Acunha, in Amsterdam Island in the S. Indian Ocean; with an Enumeration of the Phanerogams and Vascular Cryptogams of that Island and of St. Paul. By J. D. Hooker, C.B., M.D., Pres. R.S.

[Read May 7, 1874.]

It has been known for the last three quarters of a century (that is, since 1799, the date of the publication of Labillardière's 'Relation du voyage à la recherche de la Pérouse' [1791–92]), that the islet of Amsterdam (since Cook's time often confounded with that of St. Paul *), in the S. Indian Ocean (lat. 37° 52′ S., long. 77° 35′ E.), was covered with trees, whilst St. Paul's, only fifty miles to the south of it, is destitute of even a shrub. What the forest could consist of has long been a great desideratum in our knowledge of insular floras. My attention was drawn to the passage in Labillardière's narrative many years ago; and I have urged upon many commanders of ships who were about to visit the Southern Ocean the desirability of landing on the island, if only to clear up this point. The difficulty, however, of effecting a landing is so great that this has hitherto been attempted only by sealers †, who have been left on this desolate spot for months, and from whom I have found it hopeless to obtain any definite information about its vegetable productions, though they have stated that a variety of plants grow there luxuriantly, amongst which are trees with trunks several inches in diameter. They also affirm that it presents a striking contrast to St. Paul's in having no hot springs, and in the earth being nowhere heated. This is all the more remarkable, since Labillardière described it as being in a state of combustion when he passed it, though he doubts whether the fires were kindled by the hand of man or were owing to subterranean heat ‡.

* As also by myself in the 'Flora Antarctica.'

† See 'Flora Antarctica,' vol. ii. p. 221. The Novara expedition made a landing, but were unable to penetrate into the interior of the island.

‡ 'Relation,' vol. i. p. 111.

I have just received a letter from Mr. Wykeham Perry (Secretary to Captain Goodenough, the Commodore on the Pacific station), dated New Zealand, October 10, 1873, informing me that H.M.S. 'Pearl' had touched at Amsterdam Island on her passage out, and that the Commodore, who had landed, brought off a specimen of what he stated is the only tree * growing on the island, together with a fern in an imperfect state, and an armful of cabbages pulled from the deserted garden of departed whalers. The tree proved, from the Commodore's specimens which Mr. Perry sent with his letter, to be identical with *Phylica arborea*, Thouars, of Tristan d'Acunha (lat. 37° 6′ S., long. 12° 2′ W.)—a most singular fact, considering that about 5000 miles of ocean intervene between these oceanic specks of land. The fern was a frond of *Lomaria*, without fructification.

The genus *Phylica* consists of some sixty-five species, the head-quarters of which is S. Africa: a few are Madagascarian; one is peculiar to St. Helena; and the only other is the subject of this notice. It therefore connects botanically the three remote islets of St. Helena, Tristan d'Acunha, and Amsterdam with one another and with the African continent.

Speculations as to the causes that have led to the establishment of *P. arborea* on Tristan d'Acunha and Amsterdam are, in the present state of science, hopelessly vague. Winds, birds, and oceanic currents offer the readiest solution; the only other is the possible former existence of continuous land, or of groups of islets between these two spots, which lie in almost exactly the same latitude. Against this last hypothesis may reasonably be urged the difficulty of conceiving that a plant so high in the scale should have retained in each locality identically the same characters of form, habit, vestiture (it is a densely woolly plant) during the countless ages that have presumably elapsed since the submergence or destruction of the hypothetical intervening land or islands. The prevalent winds and currents of the South Atlantic and South Indian Oceans in the latitude of Tristan d'Acunha and Amsterdam Island are westerly, which is against the hypothesis

* I extract the following remark from an unpublished Admiralty Report by Lieut. Hosken, R.N., H.M.S. 'Pearl.' "On the N.E. side, near the coast, on lower ranges small trees struggled for existence, looking stunted in their growth; the grass was longer and thicker than it was to the southward, making it difficult to walk through it."

of the Tristan-d'Acunha *Phylica* either having been transported thither from Amsterdam, or being an altered form of a species imported from S. Africa. It is not, however, inconceivable that the *Phylica arborea* may have originated in Amsterdam from seeds imported from S. Africa, though how it should afterwards have been transported to Tristan d'Acunha is not obvious.

Since writing the above remarks, Prof. Oliver has called my attention to a paper by Dr. W. H. Reichardt, in the twenty-first volume of the Vienna 'Verhandlungen der k. k. zool.-bot. Gesellschaft' (1871), "On the Flora of St. Paul's Island." In this a list is given of eleven plants collected by Sir G. Staunton on the Island of Amsterdam, and which Dr. Reichardt has, owing to the confusion about the names, not perceived really belong to St. Paul's, *i. e.* the southern island. There can, however, be no doubt upon this point; for in Macartney's 'Voyage' (i. 226) it is expressly stated that the northern island (*now* called Amsterdam) "was overspread with shrubs and trees of a middling size," and that the expedition did *not* land upon it. The plants collected by Sir G. Staunton which Dr. Reichardt examined are, no doubt, a set of duplicates of those preserved in the Banksian Herbarium. In searching for these plants, dispersed as they are in the arranged collection at the British Museum, I had nothing to guide me; and some of the species which Dr. Reichardt enumerates escaped my notice in preparing my 'Flora Antarctica.'

This was unfortunately the case with the most interesting, namely the large grass which appears to abound on both islands. Dr. Reichardt is probably correct in identifying this with a plant only otherwise known (like the *Phylica*) as a native of Tristan d'Acunha, namely *Spartina arundinacea*, Carmich.

The members of the 'Novara' expedition landed with great difficulty on the northern island (Amsterdam) (1857). They found the *Spartina* covering broad tracts and offering as much difficulty in pushing through it as the densest virgin forest. They gathered no specimen, but identified it with the similar grass of St. Paul's. The party only succeeded in ascending a small hillock of scoria distant about twenty paces from the landing-place. They collected no plants; but they ascertained the existence upon the island of small trees and low scrub. The trees had the habit of Conifers (they were probably the *Phylica*); the shrubs were of a

light green, forming a dense growth which covered large surfaces of the middle and lower declivities of the island *.

It will tend to clear off difficulties to give the subjoined lists of the vascular cryptogams and flowering plants actually known (from the materials which have passed under the notice of myself and Dr. Reichardt) to belong to the two islands. In these lists I have incorporated some additional species contained in a small collection made in 1853 on St. Paul's Island by M'Gillivray and Milne, of H.M.S. 'Herald.' I have given under each species the name of the first person who collected it on either island, and have also added the contiguous geographical distribution.

Amsterdam (northern island).

Phylica arborea, *Thouars.*
Captain Goodenough.

Spartina arundinacea, *Carmich.*
Novara expedition.

Lomaria, sp.
Captain Goodenough.
The specimen is very insufficient for determination; but Mr. Baker tells me that it belongs most probably to a new species. It is most like *L. procera*, Spreng.; but the veining is different.

St. Paul (southern island).

[Stellaria media, *With.*
Most probably introduced (Lieut. Smith, 'Flor. Ant.' ii. 250).]

Sagina hochstetteri, *Rchdt.*
Sir G. Staunton.

Colobanthus diffusus, *H. f.*
Sir G. Staunton.

Azorella ?
Sir G. Staunton.

Apium australe, *Thouars.*
M'Gillivray and Milne.

[Daucus carota, *L.*
"Introduced only," M'Gillivray and Milne.]

Sonchus oleraceus, *L.*, and vars.
McGillivray and Milne, indigenous.

* Reise d. Novara, i. pp. 267, 268; Reichardt, *l. c.* pp. 10 & 31.

[SONCHUS ARVENSIS, *L.*

Novara expedition.]

CONVOLVULUS SEPIUM, *L.*

McGillivray and Milne.

PLANTAGO STAUNTONI, *Rchdt.*

Sir G. Staunton.

ISOLEPIS NODOSA, *R. Br.*

Novara expedition.

Reichardt remarks that this is nearly allied to *I. sulcata*, Kunth, which is found in Tristan d'Acunha.

POA ANNUA, *L.*

McGillivray and Milne. Frequent.

POA NOVARÆ, *Rchdt.*

Novara expedition.

DANTHONIA RADICANS, *Steud.*

Novara expedition. Cape of Good Hope.

An indeterminate *Danthonia* was collected by McGillivray and Milne.

SPARTINA ARUNDINACEA, *Carmich.*

McGillivray and Milne.

POLYPOGON MONSPELIENSIS, *Desf.*

β. MINOR, *Nees ab E.*

Novara Expedition. Cape of Good Hope.

McGillivray and Milne's collection contains a grass which they mark with doubt as introduced, and which is probably this species.

[PANICUM SANGUINALE, *L.*

McGillivray thought it introduced.]

HOLCUS LANATUS, *L.*

Novara expedition.

[H. MOLLIS, *L.* ?

"Introduced only," McGillivray and Milne.

LYCOPODIUM CERNUUM, *L.*

Sir G. Staunton.

McGillivray and Milne remark, "growing in water at 114°,

air at 65°, on the face of a bank exposed to the sun on the summit of the mountain."

This is a curious instance of the existence in the neighbourhood of hot springs of a tropical species beyond its proper latitudinal range. In the Azores *Lycopodium cernuum* is also found in the proximity of hot springs. Other instances of the same kind are afforded by the occurrence of *Gleichenia dichotoma*, Willd., *Nephrodium molle*, Desv., *N. unitum*, Br., and *Nephrolepis tuberosa*, Presl, in the Northern Island of New Zealand *.

LOMARIA ALPINA, *Spreng.*

Novara expedition.

Kerguelen's Land, Tristan d'Acunha, S. America, Australia, New Zealand.

BLECHNUM AUSTRALE, *L.*

Sir G. Staunton.

Mr. Baker informs me that the St.-Paul specimens collected by McGillivray and Milne belong to the New-world *B. hastatum*, Kaulf., rather than to the Old-world segregate. The Tristan-d'Acunha plant is *B. australe* proper †.

ASPLENIUM FURCATUM, *Thunb.*

McGillivray and Milne. "Growing amongst stones on the margin of the basin—the only place I observed this plant."

This, like *Lycopodium cernuum*, is distributed throughout the tropics.

NEPHRODIUM (LASTREA) ANTARCTICUM, n. sp., *Baker.*

Reichardt includes this in his list under the name of *Aspidium oppositum*, Kaulf. Mr. Baker, however, points out to me that that is a species absolutely endemic to the Mascarene Islands,

* The occurrence of *L. cernuum* in the neighbourhood of hot springs both in the Azores and at St. Paul is mentioned by Berkeley (Introd. to Crypt. Bot. p. 561); but the temperatures quoted belong to the latter and not to the former.

Mr. Kirk has lately informed me that the *Gleichenia* grows at Rotomahana "to the height of 6 feet or more, amongst *Leptospermum* &c., on steaming soil that scarcely bears your weight, and which, on the slightest rupture of the surface, emits dense jets of heated steam."

Another instance of the same kind is afforded by the variety of *Nymphæa lotus* (*N. thermalis*, DC. Syst. ii. 54), which grows in the hot springs of Hungary, the temperature of which is 95° F.

† In the 'Flora Brasiliensis,' Mr. Baker unites *B. hastatum* with *B. australe*.

and not occurring, as Reichardt states, at the Cape. The Novara expedition found it over the whole island; and Reichardt identifies it with the species collected by Sir G. Staunton, of which he has seen a specimen, and which is also amongst Staunton's plants in the British Museum. Mr. Baker has obligingly examined it there, and considers it to be an undescribed species. He has furnished me with the following description :—

Frondibus deltoideo-rhomboideis glabris modice firmis, utrinque cum stipite et rachibus nudis, pinnis contiguis, inferioribus deltoideis, infimis paulo reductis, superioribus lanceolatis, segmentis tertiariis oblongis basi late adnatis obtusis, maximis obscure pinnatifidis spinuloso-dentatis, venis in segmentis tertiariis pinnatis venulis erecto-patentibus inferioribus furcatis, soris utrinque costas segmentorum uniseriatis vix contiguis, involucro firmo glabro persistente.

Island of "Amsterdam" (St. Paul), *Sir G. Staunton.*

A single specimen in the Banksian herbarium. The specimen not complete at the base, and no basal scales shown. Half a foot of subcastaneous naked stipe remains. Frond a foot long, 8–9 inches broad, the lowest pinnæ a little shorter than those below the middle of the frond, the texture being similar to that of *N. Filix-mas*, and both surfaces and the stipe and rachis being entirely destitute of hairs and scales. Veins fine and moderately close. Involucre as in the forms of *N. Filix-mas*, with small reniform glabrous sori $\frac{1}{3}$–$\frac{1}{4}$ line broad. Habit, sori, texture, and veining like those of some compound forms of *N. Filix-mas*, especially the Madeiran one, but distinctly separated by the spinulose teeth; so that, on the whole, of familiar types it is most like *rigidum*, but with the general outline and habit of *cognatum* or *Napoleonis*.

N. sp.

Novara expedition.

"*A. dilatato*, Sw., sp. affinis" of Reichardt's list.

[Read June 4, 1874.]

I am indebted to Mr. Mitten for the following synopsis of the mosses of the Island of St. Paul, as far as at present known.

CERATODON PURPUREUS (*Linn. Sp. Plant.* 1575, Mnium).—C. calycinus, *Hampe, MS., Reichardt., Reise d. Novara, Bot.* i. p. 172?

St. Paul's Island. A few barren stems growing amongst *Campylopus falcifolius.*

Dr. Hampe's description has not yet appeared; but it is exceedingly probable that the specimens are all referable to the same ubiquitous species, which varies very greatly in the perichætial leaves.

CAMPYLOPUS INTROFLEXUS (*Hedw. Sp. Musc.* t. 29, Dicranum).—C. eximius, *Reich. Reise d. Novara, Bot.* i. p. 167, t. 28.

St. Paul's Island, *Milne.*

Specimens fertile and complete, in no particular different from southern forms of this widely spread species.

Reichardt's excellent description seems to leave no doubt of his having had this species before him; in external appearance and colour it is subject to great variation, and in consequence has been many times described.

C. CLAVATUS, *R. Brown, Schwaegr.* t. 255.—C. flexuosus, *Brid. ex Hook. f. in Flor. Ant.* ii. 408?

St. Paul's Island, *Milne, Strange.*

Very tall slender specimens exactly agreeing in the form and substance of the leaf with New-Zealand specimens, but with leaves here and there on the stems having their margins about the middle very minutely crenulate.

C. FALCIFOLIUS, *Mitt.*, n. sp. Cæspitosus, humilis. Caulis gracilis, subsimplex, innovationibus ramisque inferne sparsim radiculosis. Folia secunda, falcata, a basi sublanceolata, sensim longe acuminata, canaliculata, nervo obscuro basi folii latitudinis ⅓ occupante, apicem versus indistincto, ibique dorso marginibusque minute denticulatis, cellulis alaribus utrinque spatium subquadratum planum occupantibus, laxis, pallide fuscis, superioribus ad nervi latera majoribus, marginalibus reliquisque superioribus sensim minoribus quadrato-oblongis areolata; perichætialia longiora, a basi convoluta, cellulis elongatis areolata, nervo angustiore supra fere obsoleto angustissime marginato evidentius serrulato. Theca in pedunculo humido cygnicolliflexo, ovalis, æqualis, sicca plicata, operculo rostrato, calyptra basi nuda. Planta mascula gracilior, floribus terminalibus solitariis gemmiformibus.

Hab.* St. Paul's, *Milne* 23, *Strange.

Stems half an inch high, in close but not coherent tufts. Leaves of the stems 3 lines long, not glossy, dull yellowish green

perichætial leaves $4\frac{1}{2}$ lines long, all very falcate. Alary cells well marked, but not dilated or impressed. Seta 6 lines long, pale straw-coloured. Capsule small, rather thin. Calyptra not seen *in situ*, but washed out from amongst the leaves.—In foliage similar to *C. caudatus* from Java, but capsule quite different as well as the calyptra; and no species has yet been described in which the calyptra is bare at its base, with the capsule equal-sided accompanied by strongly falcate leaves.

Fragments of a small *Jungermannia* like *J. Starkii* are found amongst the stems of Milne's specimen.

Bryum (Webera) nutans, *Schreb. Fl. Lips.* p. 81.—B. laxum, *Reichardt, Verh. d. k.-k. zool.-bot. Ges.* xviii. 1868, *Abh.* 195; *Reise d. Novara, Bot.* i. p. 176.

St. Paul's Island, *Milne, Strange.*

Complete specimens of this species in a rather large form, with which Reichardt's description very well accords, excepting that the cilia of the internal peristome, described as "longe appendiculata," are in our specimens not appendiculate, as is usual in the *Weberæ*, although in this species the articulations of the processes are produced into lateral teeth.

Sphagnum acutifolium, *Ehrh.*—S. Reichardtii, *Hampe, in lit.*—S. acutifolium, var., *Reichdt. in Sched., Reise d. Novara, Bot.* i. p. 166.

St. Paul's Island, on the summit of the mountain, growing in water at 114°, air 65°, also on a bank exposed to the sun.

Extract from a Letter of Harry Bolus, Esq., F.L.S., to J. D. Hooker, Pres. R.S.

[Read June 18, 1874.]

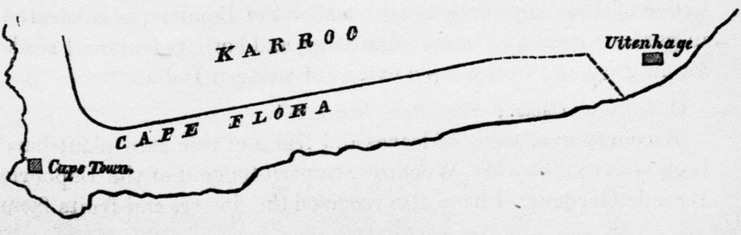
Graaft Reinet, April 4, 1874.

* * * * *

My translation of Meyer and Drege being completed, I have begun that of Grisebach's 'Vegetation der Erde,' as to the Kalahari and Cape provinces only. In this work the vast mass of information scattered throughout travels old and new, and in periodical publications, has been laboriously tabulated and made available to the student; and in so doing the author has rendered a service to science which can hardly be overestimated. But

work of a higher kind still remains to be done—to trace how and when the numerous floras of the earth have become grouped as they have. Grisebach seems to be satisfied with the theory of independent centres of creation; but the difficulties of this theory seem enormous to those who have grown up in the new school. Here is a sentence from his remarks on Cape plants and the great variety they exhibit at different elevations:—"Still this [decrease of temperature] does not explain why the vegetation should be more affected here by differences of elevation than upon any other mountain of the earth. This is simply a peculiarity of the plants created in this spot—a fact of the remote past which cannot be further investigated, and of which no explanation is now possible" (!) (ii. p. 181). That is, it is so because it is, no investigation into the past being possible!

* * Grisebach, chiefly relying on an observation of Burchell's, makes the Orange river bound the Cape and Kalahari provinces. No one can respect Burchell's character as an observer more highly than I do; but in this I am convinced he is quite wrong. As a rule, a river does not form a floral boundary. I do not know whether there are exceptions; but the Orange river is not one of them. Harvey, though he had not visited it, came to a different conclusion. Some distance (twenty-five to thirty miles) south of the Orange river a formation of red sand commences; and here certain plants begin to occur which are not found further south, e. g. *Grielum*, *Unicaria*, *Aptosimum* and *Peliostomum* (several sp.), *Acacia Giraffæ*, *A. detinens*, and some others which I cannot readily remember; and here possibly the true boundary may be found. I speak only of one portion near Hopetown, and do not yet know that it holds good all along. But in truth the Kalahari flora passes so gradually into that of the upper plateau of the Roggeveld, Uitvluigt, and Winterveld, that I hardly see where the line can be drawn. I know of but



one sharp line in S. Africa—which is that of the Roodesand, Hex river, and Zwarteberg mountains, running eastward as far as Uitenhage, which cuts off the peculiar Cape flora (Ericaceæ, Proteaceæ, Rutaceæ, Restiaceæ) from the interior; and I believe that there exist few botanical boundaries as rigid where the black line runs as this; only at the extremities does it run into the other provinces. Grisebach unites the Karroo flora with the Cape province. Yet I doubt whether it does not differ more from this than from the Kalahari. At least it may prove better to establish another province, where the differences are so marked and striking.

The Roggeveld (and, indeed, the whole Karroo), by its predominance of shrubby Compositæ, surely inclines more to the desert type of plants than to the richer Cape flora.

Observations on some Indian Species of *Garcinia*.

By J. D. Hooker, M.D., C.B., Pres. R.S.

[Read June 18, 1874.]

The Garcinias of India were described, along with the other Guttiferæ of that country, by the late Dr. Thos. Anderson, Fellow of this Society, for the 'Flora of British India.' The manuscript was left with me previous to his death in 1870, and has been published in the second part of that work, together with a considerable number of supplementary notes and observations contributed by myself and enclosed within brackets.

Since the printing of that part, some very important contributions to our knowledge of the Indian species have been sent to me, and especially specimens of the little-known *G. indica*, Chois., the Brindall of the Portuguese, a plant quite unknown to modern botanists. Yet it was first brought to light by Garcias in 1574, and has been described both by Bauhin and Ray; and it is a native of the immediate neighbourhood of Bombay, is cultivated in gardens there and in the Mauritius, and both its fruit and seeds are in great use over a wide extent of western India.

G. indica, *Chois.*; *Flor. Brit. Ind.* i. 261.

Excellent specimens of leaves and fruits of this rare plant have been sent to me by Mr. Woodrow, Superintendent of the Dapoorie Botanic Gardens. I have also received the flowers and fruits from

Lt.-Col. Beddome, by whom they were collected in North Canara. From these materials, and from a good drawing recently published by Beddome in his 'Icones,' t. 276, it appears that the fruit is not mamillar at the apex. Either, therefore, this species must be removed from the group in which it is placed in Dr. Anderson's arrangement, and which is in part characterized by the mamillar fruits, or the latter character must be struck out of the diagnosis of the group. The latter is for the present the best course, the fruit being unknown in two other species, viz. *G. malaccensis*, Hook. f., and *G. bancana*, Miq.

Mr. Woodrow states that the tree is called "Amsool" by the Marattas, and the fruit known as "Kocum"—also that it flowers from November to December, and fruits from February to April.

G. Morella, *Desrouss.*; *Fl. Brit. Ind.* i. 264.

Under this species, as a variety, Mr. Hanbury has included the true Gamboge-plant of Siam, of which he has published an admirable figure and description in our 'Transactions,' from specimens cultivated at Singapore. Dr. Anderson does not admit this variety, and quotes Mr. Hanbury's paper under *G. Morella* itself, of which he describes no varieties.

Under *G. Griffithii* (Flor. Brit. Ind. i. 266) I alluded to a plant of Dr. Maingay's as being similar to it, but differing in the circumsciss anthers, and which was cultivated at Singapore as the true Gamboge of Siam. Not having examined the Garcinias myself, and misled by Anderson's suppression of var. *pedicellata*, I did not recognize this to be Mr. Hanbury's plant, which it assuredly is. It is so different in the habit of the male inflorescence from all the forms of *G. Morella* with which I have compared it, that I cannot but regard it as specifically distinct, and would suggest that it should bear the name of *G. Hanburyi*, after our eminent pharmaceutist. Its leaves differ from those of all varieties of *G. Morella* in their more ovate form and larger size, sometimes 7 by $4\frac{1}{2}$ inches; the fruit also is larger than that of *G. Morella*, as large as that of *G. Griffithii*, from which, however, this species differs wholly in the dehiscence of the anthers. The pedicel of the male flower is $\frac{1}{4}$–$\frac{1}{3}$ inch long.

G. merguensis, *Wight*; *Fl. Brit. Ind.* i. 267.

Mr. Kurz informs me that he regards the Malacca specimen of this plant collected by Maingay (155, Kew distrib.) as not referable to Wight's *G. merguensis*, but to *G. rostrata*, Hassk. (*Discostigma*

rostratum, Hassk. Cat. Plant. Hort. Bog. 213); but in this he is assuredly incorrect. Maingay's specimens not only agree with Griffith's original ones from which Wight's drawings and descriptions were taken, but differ from specimens of *G. rostrata*, sent by Teysman, in the much larger flower and different andrœcium. There is, however, amongst Helfer's Tenasserim Garcinias one apparently identical with *G. rostrata*, collected in dense woods near the sea-shore; and the same occurs amongst Motley's Bornean collections, gathered at Banjarmassing.

G. EUGENIÆFOLIA, *Wall.*; *Fl. Brit. Ind.* i. 268.

This is apparently identical with *G. brevirostris*, Scheffer (Obs. Phyt. ii. 41), from Banca.

The three species *G. eugeniæfolia*, *G. merguensis*, and *G. rostrata* are very closely allied indeed; and if correctly referred, their known habitats are:—

G. eugeniæfolia, Singapore, Malacca, Banca.
G. merguensis, Tenasserim, Malacca.
G. rostrata, Tenasserim, Java, Borneo.

G. OVALIFOLIA, *Hook. f.*, *Fl. Brit. Ind.* i. 269.

This name must give place to the previously published *G. ovalifolia* of Oliver (Flor. Trop. Africa, i. 166), and should be replaced by that of *G. spicata*, the species including as a form *Xanthochymus spicatus*, W. & A.

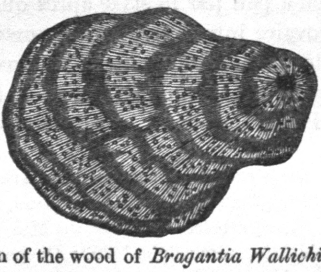
[*Note.*—*G. acuminata*, Wall. Cat. 4871, has not been taken up in the 'Flora of British India.' The specimens representing it in the Wallichian herbarium are a *mélange* of various widely different plants. Those corresponding to "A. Penang and Singapur, Wall. 1822," consist of *Ternstrœmia penangiana*, Choisy, with leaves and fruits of probably two other plants; "B. Hb. Finlays." is represented by an indeterminate Anonacea.—W. T. THISELTON DYER.]

Remarks on the Structure, Affinities, and Distribution of the genus *Aristolochia*, with Descriptions of some hitherto unpublished Species. By Maxwell T. Masters, M.D., F.R.S., F.L.S., &c.

[Read February 6, 1873.]

In indicating certain undescribed species of *Aristolochia* I may perhaps be permitted to add a few remarks on the structure and affinities of the genus, and on the geographical distribution of its species. The order to which it belongs has, comparatively recently, been made the subject of monographs by Duchartre and Klotzsch; and its salient points have been duly noted. I shall therefore merely make mention of some of them for the sake of calling attention to them rather than with the intention of discussing them at length.

The Structure of the Wood.—The peculiar structure of the wood has been described by Von Mohl, Lindley, Decaisne, Duchartre, and others. There are in the species hitherto examined no concentric zones, but the wood is broken up into wedge-like or fan-shaped masses around a central pith, and is itself encircled by a cortical parenchyma traversed by isolated bundles of liber. For further details I must refer to the writings of the authors already alluded to, as my own observations only enable me to confirm the general accuracy of theirs, and do not supply any further information. In the case of the genus *Bragantia*, however, I owe to the kindness of Dr. Cleghorn a section of the stem of *B. Wallichii*, which demands attention. The arrangement of the wood is here totally unlike that of *Aristolochia*. In the specimen alluded to, and of which the figure shows a transverse section, there is a pri-



Transverse section of the wood of *Bragantia Wallichii*, natural size.

mary cylinder of wood surrounding a pith whose cells are filled with starch-grains, and which is begirt by a dense layer of hard

dark-coloured liber, whose cells are completely filled with woody deposit. The wood itself is soft, and consists exclusively of long wood-cells, interspersed among which are porous vessels. Outside this primary cylindrical portion are arranged in layers, one over the other, imperfect zones of wood and bark—imperfect in that they appear not wholly to surround the original cylinder, but to spring from its sides, somewhat as a watch-glass does from a watch. These concentric layers differ also from the original cylinder. In the first place, they have of course no pith, the wood being applied immediately upon the cortical or liber-layer of the zone which they surround. Again, the medullary rays in the primary cylinder are small, and their component cells are only slightly, if at all, thickened by woody deposit in their interior, while in the succeeding layers the medullary rays are thick, dense, hard, and dark brown in colour, being in fact continuations of the bands or zones of liber cells which separate the wood-zones from each other. This structure is very similar to that described in some of the Menisperms*.

The Pseudo-stipules.—The nature of the stipule-like bodies at the base of the leaf-stalk in certain species has been well determined by M. Duchartre†, who refers them to the first leaves of an undeveloped branch.

The Floral Arrangements.—One of the most curious points in the floral structure of *Aristolochia* is the production of the styles from the back of the staminal tubercles. "Les styles et les stigmates," says Payer (Organogénie, p. 431, tab. 91), "ne sont donc que les dépendances des étamines." Duchartre, in allusion to the gynandrous condition, says that this character "est dû à ce que les anthères nées et formées comme dans la plupart des fleurs sont entrainées peu à peu par le style après que l'axe s'est creusé pour constituer l'ovaire inférieur, de telle sorte que leur attache d'abord horizontale, devient oblique en dedans, puis verticale ou même finalement un peu oblique en dehors" (Comptes Rendus, Oct. 10, 1853). Payer's account is very singular; and it would

* For details as to the structure of the wood in Aristolochiaceæ, see Mohl, 'Ueber d. Bau der Schlingpflanzen,' § 75; Gaudichaud, in Guillem. Archiv. ii. 501, t. 19; Decaisne, "Lardizabalées," Archiv. du Mus. 1839, i. 143; Lindley, Veg. Kingd. 793; Schleiden, 'Principles,' 253; Duchartre, Comptes Rendus, 1854, p. 1040; Oliver, "Stem of Dicotyledons," Nat. Hist. Review, July 1862.

† Duchartre, "Sur les prétendues Stipules des Aristoloches," see 'Bull. Soc. Bot. France,' i. 1854, p. 56.

rather seem as if the styles were pushed out from the axis immediately behind (above) the stamens, and that the two organs were inseparate at the base. In any case it is certain that the six carpels are opposite to the stamens.

As to teratological appearances, the only two known to me which are worthy of comment, are cases in which the flower, usually irregular, becomes regular, or partially so, by the increase in number of the irregular portions (irregular peloria). Thus in the flower of *A. trilobata* I have seen two well-developed lips each with a long, slender, tail-like process; and in *A. floribunda* I have seen the limb of the perianth divided into three equal lobes, almost as in *Asarum*.

With reference to the adaptation of the flower of *Aristolochia* so as to ensure fertilization by insects, much has been written, to which it is not my intention to refer here at greater length. I may, however, point out the frequency with which a membranous process pointing downwards and inwards is formed in the flower-tube of certain species of *Aristolochia* between the basal distended portion, or "utriculus," and the median tubular portion of the perianth. This process has been for the most part overlooked by descriptive authors. Even Duchartre seldom or never mentions it. The artists, however, have been more careful to note its presence and delineate its form. It is generally a mere rim; but in other cases it is more highly developed, as in *A. macradenia* and *A. leuconeura*, where it forms a trowel-like projection pointing towards the column (see Bot. Mag. t. 4467 and t. 5420). In *A. gigas* it is also well developed. In *A. arborea* (see Bot. Mag. t. 5295) it forms a cushion-like boss obstructing the passage to the distended portion of the tube, and rendering egress for the insect which has once got by the obstacle, or which may have obtained entrance by perforating the tube, almost an impossibility.

Affinities.—The most diverse opinions have been expressed as to the relationships of this order. Linnæus placed them near Menisperms and Dioscoreads. Robert Brown also considered them allied to the latter order, as did also Endlicher. Bartling ranged them near Balanophorads and *Cytinus*; Brongniart between Santalaceæ and Cucurbitaceæ. A. de Jussieu placed them near Cucurbits, and in the vicinity of Balanophorads and *Nepenthes*. Others have considered them allied to Taccads and Aspidistreæ. Lindley considered them intermediate between Dicotyledons, Monocotyledons, and Dictyogens, and placed them near

Loranthaceæ and Santalaceæ. It is not necessary to cite further illustrations of the difficulty of assigning a proper place in the system to these plants. For my own part, I have endeavoured to arrive at some conclusions according to the principles mentioned in my memoir on Passifloreæ (Linn. Trans. vol. xxvii. p. 619), and according to the estimate of the value of the several characters as there explained. I cannot say, however, that the results are more satisfactory than preceding attempts have been.

I have compared the characters of the order with those of the orders which have most generally or frequently been considered allied to the Aristolochias. The characters selected for the purpose of comparison as of the greatest importance and as the most distinctive (omitting exceptions) are fourteen in number, viz. the climbing habit, the peculiar structure of the wood, the alternation and the nervation of the leaves, the cymose inflorescence, the ternary arrangement of the parts of the flower, the monochlamydeous perianth, the bisexual flowers, their gynandrous condition, the adherent ovary, the axile placentation, the capsular fruit, the raphe of the seed, and the presence of albumen. These are characters certainly of unequal value, but which, with few exceptions, are found in the majority of species of the order, and particularly in the genus *Aristolochia*. Aristolochiaceæ have all fourteen of these characters, Dioscoreaceæ have only nine, Taccaceæ seven, Santalaceæ seven, Cucurbitaceæ six, and so on, as in the annexed Table :—

Orders.	Number of selected characters possessed in common with Aristolochiaceæ.	Orders.	Number of selected characters possessed in common with Aristolochiaceæ.
Aristolochiaceæ...........	14	Cucurbitaceæ.............	6
Dioscoreaceæ.............	9	Loranthaceæ	6
Taccaceæ	7	Sterculiaceæ	5
Santalaceæ.................	7	Lardizabaleæ	4
Aroideæ..	7	Balanophoreæ	4
Orchidaceæ	6	Myristicaceæ	4
Nymphæaceæ	6	Menispermaceæ...........	3
Nepenthaceæ.............	6	Hydrocharidaceæ	3

This Table, which must of course be taken as expressing an approximation only to the truth, shows that there is no very close

affinity, that the nearest allies are the Dioscoreaceæ and Taccaceæ —that is, if the number of points in common be alone considered. The truly Dicotyledonous embryo, however, of Aristolochias at once removes them to a distance from the orders named. Balanophoreæ, Santalaceæ, Loranthaceæ, Cytinaceæ, and Nepenthaceæ are all remote; and the other orders, even in the case of those which have, numerically speaking, some affinity to Aristolochias, are so widely different, that it is hardly fair to institute a comparison.

The value of the distinctive characters above cited may be estimated by remembering that they are mostly congenital, a few only being acquired or adaptive, and that they are all, relatively speaking, very constant. Of the acquired characters, there is only one of special moment; and that is the gynandrous condition. It is, however, still doubtful what degree of importance can be placed on it, as its true nature is perhaps hardly fully understood; and, indeed, if Payer's and Van Tieghem's observations be correct, there is no true gynandrism.

From a consideration of these circumstances, I am led to conclude that in point of date of introduction, if such a phrase may be allowed, the family is old and gradually dying out; hence the scarcity of links and connecting points with other orders. I am informed, however, by Mr. Carruthers that up to the present time no species have been found in a fossil condition. If, on the other hand, it be regarded as a relatively new order, then it has not yet given origin to many variations and connecting-links. The hypothesis that it is a relatively old family is, I think, borne out by its present geographical distribution. Take the genus *Aristolochia*, for example: it is represented in all quarters of the globe; but it is absent, or nearly so, from the colder regions. It is to be noted also that the tropical species are the most numerous, and that these are almost all climbers; while the South-European species are low-growing herbaceous perennials, or rarely suffrutescent. In the genus *Aristolochia* there are, speaking in general terms, about 200 species, thus distributed:—

Brazil and Guiana	57
Central America, Mexico, Texas.	29
West Indies	23
Venezuela and northern South America	15
Peru	5

94
109
203

Bolivia and Paraguay	6
United States, North America ...	5
South Europe and the Levant ...	22
Peninsular India and the Archipelago............................	12
Himalayas	4
Australia	4
Tropical Africa	10
Madagascar, Mauritius	5
China and Japan....................	6

It is to be remarked that the group of species inhabiting the United States is of a different type from those found in Central America, the West Indies, and South America. The Indian and Australian group is again distinct; and so are the tropical African and the European respectively.

The other genera of the order have but few representatives. *Asarum* occurs in Europe and in North America, *Heterotropa* is Japanese. The species of *Bragantia* are natives of India and the archipelago, as is also *Thottea*.

Uses.—As to the uses of these plants, especially in cases of snake-bite, so much has been written, that it is not necessary to enter into detail on the subject. The prevailing modern belief is, that the plants in question are absolutely inert, and owe whatever virtues they are asserted to possess to the brandy or other stimulant in which they are administered. Seeing how suddenly fatal, or at least how extremely potent are the effects of snake-poison when concentrated, it is indeed difficult to believe in the virtues of *Aristolochia* as an antidote. On the other hand, it seems wrong to ignore the reiterated testimony in their favour. They surely must have some effect; and what that is should be carefully tested. It must be borne in mind that from the time of Dioscorides and Pliny this belief has been entertained, that the natives of India very generally hold the same opinion, that the aborigines throughout the whole of tropical America place faith in one or other species of *Aristolochia*; and to a certain extent this belief is shared by modern collectors and travellers. The letters of Mr. Temple, from Honduras, in the 'Journal of the Society of Arts' for 1855, give numerous instances of this. In the Kew herbarium there is a note of Purdie attached to a specimen of *A. maxima*, collected at

Santa Marta. This species, says Purdie, is called "*contra Capitana*," from its being an antidote against the *Culebra capitana*, or the captain-serpent, a very dangerous one. I have used it for the bite of a scorpion, which it almost instantaneously cures. A piece of the branch or root is chewed and the saliva rubbed on, and some is swallowed. . . . The Indians are never without a piece of this in their pouch." Knowing what we do of the medicinal properties of *Aristolochia Serpentaria* and other species, and remembering that the belief in their virtues is spread over every country in which they are found, applies to various species, and is entertained by men of totally different races without means of intercommunication, it is surely desirable that those who have the means and opportunity should take steps to put the matter to a strict scientific test. For a summary of what is known on the subject, the standard works on materia medica should be consulted, and the brief summary which is appended to my Monograph of the Brazilian species in the 'Flora Brasiliensis.'

Appended to these notes are the descriptions of certain hitherto undescribed species, for the opportunity of describing which I am indebted to the authorities of the Kew herbarium.

1. A. (§ GYMNOLOBUS) PEARCEI, *Mast.*, sp. n. Fruticosa, volubilis; foliis ovato-oblongis, integris, basi cordatis, 5-nerviis, subtus setosis; pseudo-stipulis foliaceis cordato-reniformibus; floris tubo basi globoso dein refracto-infundibuliformi, apice in limbum ovatum acutum glabrum expanso.

Peruvia, Andahuaylas, 7000–8000 ped., *Pearce!*

Caules sulcato-striati, glabri. *Folia* circa 3 poll. long., 1¾ lat., subcoriacea, superne subglabra, subtus parce setosa; petioli 1¼–1½ poll. longi. *Pseudo-stipulæ* ½ poll. longæ. *Pedunculi* solitarii, axillares, petiolos æquantes, cum ovariis lineari-clavatis setulosis continui. *Flores* circa 1½ poll. longi, intus inter partem globosam et partem infundibuliformem processu membranaceo annuliformi prædited. *Columna* substipitata sub 2 lin. longa, campaniformis, superne 6-loba, lobis ovatis acutis ad margines revolutis, ciliolatis. *Antherarum* loculi basin loborum columnæ attingentes. *Fructus* adhuc ignotus.

2. A. (§ GYMNOLOBUS) PANNOSA, *Mast.*, sp. n. Herbacea, foliis late cordatis, ovatis acutis, subtus dense pubescentibus; pseudo-stipulis nullis; floris tubo hispido, basi dilatato, medio haud refracto, cylindrato, superne infundibuliformi et in labium ovatum maculatum papulisque obsitum expanso.

Peruvia orientalis, prope Yurimaguas locis graminosis ad flumen Huallaga, *Spruce*, n. 3901 !

Caules teretes uti petioli pedunculique ferrugineo-hispidi. *Folia* $3\frac{1}{2}$ poll. longa, 3 poll. lata, coriacea, superne glabra, subtus dense pubescentia, basi 5-nervia, cordato-biloba, lobis rotundatis late divaricatis; petioli circa $1\frac{1}{4}$ poll. longi. *Pedunculi* solitarii axillares petiolos æquantes. *Flores* circa 3 poll. longi, sordide purpurei venisque pallidioribus, basi inæquilateri ventricosi, medio anguste cylindrato-tubulati, superne ampliati in limbum ovatum pallide flavum (*Spruce*) maculis papulisque nigro-purpureis obsitum. *Columnam fructumque* haud vidi.

3. A. (§ Diplolobus) imbricata, *Mast.*, sp. n. Fruticosa, fulvo-pubescens; foliis subsessilibus cordatis oblongo-lanceolatis; inflorescentia pluriflora; perianthio super ovarium stipitato subrecto, basi globoso, medio tubulato, apice in limbum periphericum subbilabiatum expanso.

In Insulis Philippinensibus, *Cuming*, 1247 !

Caules teretes flexuosi. *Folia* $5\frac{1}{2}$ poll. longa, $1\frac{1}{2}$ poll. lata, subcoriacea, basi 3-nervia cordato-biloba, lobis rotundatis eos folii superpositi imbricantibus; petioli subnulli. *Prophylla* desunt. *Flores* axillares, cymosi. *Perianthium* $1\frac{1}{4}$ poll. longum, extus hispidum. *Floris tubus* spatio 1-lineari super ovarium oblongum anguste cylindratus, dein ventricosus subinæquilaterus, medio tubulato-cylindratus, intus a parte ventricosa processu membranaceo annulariformi separatus, superne in limbum periphericum subbilabiatum expansus. Limbi labium alterum parvum rotundatum, alterum multo majus oblongo-lanceolatum flavum basi purpureo-maculatum. *Columna* stipitata, claviformis; lobi stylini ovati acuti, apice conniventes, infra basin processu annulariformi prædití. *Antheræ* lineari-oblongæ, ad apices processum jam descriptum fere attingentes. *Ovarium* lineari-oblongum hispidum. *Fructus* haud vidi.

4. A. (§ Diplolobus) ungulifolia, *Mast.*, sp. n. Volubilis, glabra; foliis suborbicularibus alte 3-sectis, lobis lateralibus curvatis apice rotundatis; floribus racemosis; perianthio super ovarium stipitulato, basi globoso, medio parum arcuato tubulato, superne in limbum periphericum peltatum subbilabiatum expanso.

Labuan, *Motley ! Barber !*

Herbacea? vel fruticosa? *Caules* glabri teretes sulcato-striati. *Folia* 6–7 poll. longa et lata, glabra, coriacea, basi pedatim 5-nervia, cordata, basi inter lobos rotundatos divaricatos in petiolum cuneatim attenuata, ultra medium in lobos tres divisa, lobo medio oblongo-obovato parum majore ad basin parum angustiore, versus apicem dilatato, lobis lateralibus arcuatis obtusis, sinibus inter lobos latis apice parum contractis; petioli $1\frac{3}{4}$ poll. longi. *Prophylla* desunt. *Flores* (ut videtur) racemosi, singuli circa 3 poll. longi. *Perianthii* tubus basi

super ovarium angustissimum stipitem efformans, dein ventricosus, ad medium cylindratus, intus omnino lævis, superne in limbum planiusculum glabrum periphericum subbilabiatum expansus, labio altero majore oblongo, altero minuto. *Columna* stipitata claviformis; lobi stylini lineari-oblongi arcuati, ad apices conniventes, infra basin processu membranaceo annuliformi undulato præditi. *Antheræ* oblongæ subrotundatæ, loculis parallelibus processum annulariformem haud attingentibus. *Ovarium* et fructum haud vidi.

There are, in addition to the above, two or three other species of *Aristolochia* from South-eastern tropical Africa and one from Abyssinia which appear to be undescribed; but the material is too imperfect to allow of their being more than mentioned.

Monographic Sketch of the Durioneæ.

By Maxwell T. Masters, M.D., F.R.S., F.L.S.

[Read November 19, 1874.]

(Plates XIV., XV., XVI.)

The subtribe of Malvaceæ, called in Bentham and Hooker's 'Genera Plantarum' (i. 199) Durioneæ, comprises a small number of genera and species of much interest structurally, and also as regards their geographical distribution. The species are all arborescent, and all more or less clothed with large peltate scales, each supported on a more or less conical process. In the case of the fruit it often happens that these processes greatly increase in size and ultimately form the muricate processes with which the fruits are beset. They all have simple leaves, often of considerable size. Most of them have an epicalyx of two or three bracts, which often remain inseparate till the increasing size of the parts within causes them to burst more or less irregularly. The andrœcium consists usually of four or five phalanges or branched stamens, sometimes placed opposite to, at other times alternate with, the petals. Many genera of Malvaceæ, especially of Bombaceæ, have this arrangement—for instance, *Kydia*, where the andrœcium is divided into five phalanges placed opposite the sepals. The relative position of the stamens and of the carpels to the other parts of the flower requires careful attention in this group, as indeed in other genera of the Malval alliance. This relative position is

generally easily enough observable in fresh specimens and young buds (but not always), while in dried specimens it is often impossible to determine the correct position with accuracy. Organogeny shows in some cases, as where the stamens are opposite the petals, that the latter are not autonomous organs, but that each is an integral portion of the stamen; where, however, the stamens are placed opposite the sepals their individuality may be regarded as separate from that of the petals. Of the truly branched or compound nature of these stamens there can be little doubt. On this point I have little to add to what has been advanced by other morphologists (as Payer, Sachs, Baillon, Dickson, and others), and to what I have stated in my paper on the Morphology of the Malvales in the tenth volume of the Journal of this Society. Indeed I should not have thought it requisite to allude further to the subject now, were it not that comparatively lately the existence of compound or, rather, of divided stamens in Malvales and other plants has been denied by M. Chatin (Bull. Soc. Bot. France, 1874, xxi. p. 68), on the ground that each of the stamens of the phalanx originates directly from the thalamus, and not as a lateral outgrowth from the primordial stamen. My own observation of the course of development in the andrœcium leads me to doubt the accuracy of M. Chatin's opinion, though in such matters it behoves one to be very cautious in arriving at any conclusion. To me it has always appeared that the terminal or central stamen of each phalanx, whether fertile or anantherous, is developed first, and the others in succession from above downwards, from the sides of the primary stamen, as in the case of the lobes of a divided leaf. It is, however, by no means easy in all cases to determine whether the later-formed staminal tubercles originate directly from the axis, or from the sides of the primordial stamen; and this difficulty is enhanced by the nearly simultaneous appearance of all the tubercles in particular cases. It may, however, generally be observed that the terminal lobe or tubercle is the largest.

Analogy and comparative morphology, including teratology, furnish ample evidence in support of the doctrine that in Malvales, at any rate, the phalanges do really often, if not always, represent divided staminal leaves. The structure of the Byttneriaceæ, and of *Glossostemon* in particular, is very instructive from this point of view, as explained in my former paper*. If de-

* See Baillon, 'Traité du Développement de la Fleur' &c. p. 26 (Byttneriées).

velopment gives at present uncertain or conflicting evidence, this arises from the inherent difficulties in the way of coming to a correct conclusion, as well as from the fact that the course of development varies in different genera, and has as yet only been studied in a very few. Anatomy, too, favours the notion of divided stamens; thus we find M. van Tieghem distinctly asserting, from the position, number, and arrangement of the vascular bundles, that the stamens of Mallows may be referred to five leaf organs *.

The anthers are often very remarkable, and vary somewhat in different genera. In some cases they are manifestly 2-celled, the cells being separated by a broad connective; at other times they are apparently 1-celled only. In many Malvales the anthers are 1-celled in the adult stage, simply through the obliteration of the partitions between the adjacent lobes, and the consequent welding of two cells into one. In *Pentapetes* and some other genera the anthers remain permanently 2-celled. In *Boschia* the anthers are quite peculiar and resemble in form the anthers of *Polygala*. In any case the anthers of this group conclusively show that a small portion only, and not the whole, of the blade of a leaf, or its representative, may be differentiated to produce pollen. In some cases staminodes or abortive stamens are found within the true stamens.

The carpels are usually isomerous with the petals, and coherent; but in *Dialycarpa*, a new genus hereinafter described, the carpels are only three in number and are easily separated one from the other, except at the apices of the styles. The ovules vary in number and direction in the different genera, and require to be carefully investigated, especially in fresh specimens, owing to the frequent peculiarity of their direction.

The fruit is often muricate and capsular, but is smooth in some instances. The seeds are frequently provided with a fleshy aril; and the cotyledons are fleshy and often unequal in size. In many cases, however, the seeds are not known; nor, indeed, have I personally been enabled to examine the seeds in any one genus.

The subtribe consists, according to Bentham and Hooker, of six genera, viz. *Cullenia*, *Durio*, *Lahia*, *Boschia*, *Neesia*, and *Cœ-*

* See Van Tieghem's translation of Sach's 'Lehrbuch,' p. 622, adnot. M. van Tieghem, however, advances views respecting other parts of the flowers of Mallows which I should not be disposed to accept without further evidence.

lostegia, each comprising only a small number of species. In Hooker's 'Flora of British India,' vol. i. p. 350 *et seq.*, I have described a few additional species from Malaya, and in Hooker's 'Icones,' t. 1119, a new genus, *Camptostemon*, from Tropical Australia.

In the present communication I give the characters, so far as they are known to me, of sundry other species and one new genus, all collected in Borneo by Signor Beccari. I have been enabled to examine these plants at Kew through the courtesy of the Curators, and also at Florence, thanks to the kindness of Professor Parlatore and the officers of the Botanical Museum of that city.

It will be seen, from what has just been stated, that the species are for the most part natives of the southern extremity of the Malay peninsula and of the islands of the Malay archipelago. It is probable that the less-known islands of the latter group may yet furnish other species of this tribe when their botanical riches shall be made known. One species (*Cullenia excelsa*) occurs in Malabar, while *Camptostemon Schulzii* is a native of Tropical Australia.

All authors agree in referring these genera to the suborder Bombaceæ, of which they constitute a well-marked tribe, the genus *Camptostemon* connecting the Durioneæ with the other Bombaceæ and Malvaceæ generally.

The following enumeration includes the names of all the genera and species of the subtribe Durioneæ at present known, together with descriptions of the new Bornean species and incidental notes on their structure &c.

CULLENIA, *Wight*.

Cullenia, Wight, Ic. t. 1761, 1762; Benth. et Hook. Gen. Pl. i. 212; Baill. Hist. Pl. iv. (Malvaceæ), p. 159.

C. EXCELSA, *Wight, Ic.* 1761; *Beddome, Flor. Sylvat. Anal. Gen.* t. iv.; *Mast. in Hook. Fl. Ind.* i. 350.—Durio ceylanicus, *Gardn. in Calcutt. Journ. Nat. Hist.* viii.

Malabar, Ceylon.

This genus is principally remarkable for the absence of petals and the 5-fid andrœcium. The five phalanges or branched stamens are here linear, and bear the minute anthers in globose heads; towards the base the phalanges are inseparate and form a tube through which the elongate style passes. The ovules are

two in number in each cell; and the fruit and seeds are described as similar to those of *Durio*. In some respects, and particularly in the andrœcium, *Cullenia* may be compared to *Matisia*.

Durio, *Linn.*

Durio, Linn. Syst. Nat. ed. xiii. 581; DC. Prodr. i. 480; Endl. Gen. Pl. 990, n. 5305; Benth. et Hook. Gen. Pl. i. 213; Baill. Hist. Pl. iv. 158; Mast. in Hook. Fl. Brit. Ind. i. 351.

The chief morphological peculiarities of this genus reside in the andrœcium, which consists of five phalanges, which in the bud are approximated into a pyramidal tube, but which are detached and spreading in the adult flower and placed opposite to the petals. The primary ramifications of each phalanx bear, in some of the species, not a single anther, but a globose head of anthers. The individual anthers are usually sinuous and open by a long chink, as in many Cucurbitaceæ. In *Durio Oxleyanus* each filament bears a single orbicular, or ring-like, peltate anther, the filament being dilated into a thick connective, around which the linear anther-lobe or lobes (?) are placed. Probably in the young state each anther has two widely diverging cells, which ultimately become fused into one by the obliteration of the intervening partition.

In one of the new species herein described, *D. carinatus*, the filaments bear sometimes single anthers, at other times groups of anthers; and when single, they are evidently two-celled, though annular, as in *D. Oxleyanus*, the ring being contracted in the middle as in the figure ∞.

The ovules are numerous in each cell of the ovary; and the fruit ripens into a large muricate more or less five-valved capsule. The arillate seeds are described and figured by Kœnig in the 'Transactions' of this Society, vol. vii. p. 272, t. 14–16.

1. D. LANCEOLATUS, *Mast.*, sp. n. Foliis lanceolatis superne glabris subtus dense lepidotis; floribus mediæ magnitudinis (diam. circa 2 poll.); andrœcio ima basi tubulato, antheris capitatis singulis annularibus; ovario lepidoto.

Borneo, Sarawak, *Beccari*, 2610!

Arbor. *Rami* teretes cortice rimoso brunneo tecti. *Folia* 3 poll. long., 1 poll. lat., coriacea, superne glabra, subtus dense ferrugineo-lepidota, basi acuta; nervus medius prominens, nervi secundarii approximati; petioli ½–¾-poll., sursum incrassati. *Cymæ* laterales di- v. trichotomi;

pedicelli $\frac{1}{2}$-3 poll. longi. *Flores* diametro circa 2-poll. *Epicalyx* primo clausus demum irregulariter ruptus coriaceus lepidotus. *Calyx* clausus demum irregulariter 2-valvis epicalyce parum brevior, coriaceus, extus lepidotus, intus pubescens. *Petala* 5 contorto-imbricata glabra ovato-oblonga breviter unguiculata. *Andrœcium* e staminibus (phalangibus) 5 pluriramosis infra medium inseparatis, tubumque efformantibus, constans; filamenta ∞ crassiuscula glabra, singula 2–3-antherifera; antheræ reniformi-orbiculatæ lobis connectivum cingentibus. *Ovarium* $\frac{1}{2}$ poll. long. (stylo incluso), oblongum, 5-lobum, 5-loculare, extus, squamis orbicularibus ciliatis peltatis stipitatis vestitum; stylus ovario æquilongus cylindratus stellato-pilosus stigmate capitato superatus. *Ovula* 2 in quoque loculo placentæ axili affixa, ascendentia, raphe juxta placentam sita. *Fructus* haud vidi.

2. D. CARINATUS, *Mast.*, sp. n. Foliis oblongo-lanceolatis superne glabris, subtus dense lepidotis, nervoque medio ibi valde prominente; floribus mediocris magnitudinis; andrœcio basi tubulato, antheris annularibus; ovario lepidoto.

Borneo, *Beccari*, 600, 2688, 4019!

Arbor. *Rami* teretes. *Folia* coriacea, 4 poll. long., $1\frac{3}{4}$ poll. lat., basi rotundata; petiolus $\frac{3}{4}$-poll. *Cymæ* laterales trichotomæ; pedicelli angulati squamosi suberosi. *Alabastra* oblonga obtusa. *Epicalyx* æque ac calyx primo clausus, extus lepidotus, intus pubescens. *Petala* 5 contorto-imbricata, oblonga obtusa sessilia extus dense pubescentia, intus glabra. *Andrœcium* e phalangibus 5 basi inseparatis tubulatis constans, filamenta carnosula stellato-pilosa, singula 1- vel pluriantherifera; antheræ annulares 1- vel nonnunquam manifeste 2-loculares. *Ovarium* oblongum 5-lobum, squamosum; stylus longiusculus cylindratus vel subangulatus stellato-pilosus; stigma capitatum.

3. D. OBLONGUS, *Mast.*, sp. n. Foliis oblongis obtusis superne glabris subtus dense lepidotis; floribus magnis (diametro 3-pollicaribus), andrœcio ad medium tubulato, antheris capitatis singulis annularibus vel raro gyrosis, ovario lepidoto.

Borneo, *Beccari*, 616, 855, 1204, 2921, 3088!

Arbor. *Rami* juniores angulati lepidoti. *Folia* 8 poll. long., $3\frac{1}{4}$ poll. lat., coriacea, basi rotundata, vernatione conduplicata; petioli $\frac{1}{2}$-poll. *Stipulæ* $1\frac{1}{4}$-poll., lanceolatæ. *Alabastra* ovoidea. *Epicalyx* demum bivalvis extus lepidotus intus pubescens. *Calyx* demum 5-sepalus, sepalis ovato-lanceolatis fere $1\frac{1}{2}$-pollicaribus, coriaceis extus lepidotis intus pubescentibus. *Petala* 5 sepalis parum longiora e basi rhomboidea ovato-lanceolata, membranacea, utrinque, præcipue versus basin, stellato-pilosa; nervi graciles basi approximati apice divergentes. *Andrœcium* e phalangibus 5, infra medium inseparatis tubulatis;

filamenta ∞ carnosula puberula pluriantherifera; antheræ capitatæ singulæ annulares. *Ovarium* oblongum 5-lobum squamosum; stylus pollicaris stellato-pilosus, stigmate capitato superatus.

4. D. LISSOCARPUS, *Mast.*, sp. n. Foliis oblongis vel oblongo-lanceolatis superne glabris subtus dense lepidotis; floribus diametro vix pollicaribus; andrœcio basi tubulato, antheris capitatis, singulis annularibus vel raro gyrosis; ovario squamis destituto.

Borneo, *Beccari*, 427!

Arbor. *Rami* angulati glabri. *Folia* 3–4 poll. long., 1–1¼ poll. lat., coriacea, basi rotundata; nervus medius subtus prominens, nervi secundarii approximati; petioli ½-pollicares. *Alabastra* ovato-oblonga acuta. *Epicalyx* primo clausus, coriaceus, extus lepidotus, intus pubescens. *Calyx* clausus squamis maximis vestitus, intus glaber. *Petala* 5 contorto-imbricata subcoriacea, extus apicem versus stellato-pilosa, oblonga obtusa sessilia. *Andrœcium* e phalangibus 5 infra medium inseparatis tubulatis constans; filamenta ∞ crassiuscula pluriantherifera; antheræ capitatæ annulares vel sinuosæ. *Ovarium* 5-lobum 5-loculare squamis destitutum; stylus crassus glaber; stigma magnum capitatum ciliatum. *Flores* immaturos tantum vidi.

5. D. ZIBETHINUS, *Kœn. in Trans. Linn. Soc.* vii. 266, t. 14–16. Foliis (6–7 poll. long.) obovato-oblongis basi rotundatis, superne glabris, subtus lepidotis, floribus magnis (diametro 3-poll.); andrœcio basi tubulato, antheris capitatis sinuosis, ovario lepidoto.

Pro synonymia vide Mast. in 'Hook. Flor. Brit. Ind.' i. 351.

Malaya, Borneo, etc. ubique culta.

Quoad fructum confer Wallace in 'Hook. Journ. Bot.' vii. 228.

6. D. MALACCENSIS, *Planch. in herb. Kew.* Foliis ut in *D. zibethino*, floribus autem diametro 5-pollicaribus, andrœcio infra medium tubulato, antheris sinuosis capitatis, ovario lepidoto.—*Mast. in Hook. Flor. Brit. Ind.* i. 351 (vide Tab. XIV. fig. 17–20).

Malaya, Borneo, *Beccari*, 852, 2190?, 2590?!

An forma sylvestris *Durionis zibethini*?

7. D. OXLEYANUS, *Griff. Notul.* iv. 531. Foliis ut in *D. zibethino*, sed infra pubescentibus, nervo medio tantum lepidoto; floribus 1-pollicaribus, andrœcio infra medium tubulato filamentis ∞, 1-antheriferis, antheris annularibus, ovario styloque ut in *D. zibethino*—*Mast. in Hook. Flor. Brit. Ind.* i. 351 (vide etiam post, Tab. XIV. fig. 13–16).

LAHIA, *Hassk.*

Lahia, Hassk. Hort. Bogor. ed. nov. 99; Miquel, Flor. Ind. Bat. i. pt. 2, 168; Benth. et Hook. Gen. Pl. i. 213.

1. L. KUTEJENSIS, *Hassk. Hort. Bogor.* p. 100.
Borneo.
Species a me haud visa.

BOSCHIA, *Korth.*

Boschia, Korth. Verh. Nat. Gesch. 257, t. 69; Miq. Flor. Ind. Bat. i. pt. 2, 168; Benth. et Hook. Gen. Pl. i. 213; Baill. Hist. Pl. iv. 159; Mast. in Hook. Flor. Brit. Ind. i. 351.
Heteropyxis, Griff. Notul. iv. 524, t. 594.

Genus nec cum *Boscia*, Lam., neque cum *Boscia*, Thunb., confundendum.

In this genus the chief structural peculiarities consist in the linear petals and the andrœcium. The staminodes are so much like petals that it is not easy to distinguish the two organs. In *B. Griffithii* there are five petals, and within them ten staminodes of the same form as the petals. The staminodes resemble those of *Pityranthe* in Tiliaceæ. The fertile stamens are very numerous, and in most cases nearly free or inseparate in the adult flower; though in the undeveloped state, probably the filaments will be found to spring from a definite number of phalanges, as, indeed, they do in *B. grandiflora*. The anthers are very remarkable, and are arranged singly or in groups on the ends of the filaments; each anther is very minute, oblong, and opens by a small terminal pore. The fruit and seeds are in essential points the same as those of the species of *Durio*.

1. B. GRANDIFLORA, *Mast.*, sp. n. Foliis obovato-oblongis breviter subitoque acuminatis; floribus subsessilibus subsolitariis, diametro 2-poll. et ultra; epicalyce demum tripartito, calyce basi pentagono.

Borneo, Sarawak, *Beccari*, 1620! (vide Tab. XV. fig. 21–28).

Arbor. *Folia* 8 poll. long., 3 poll. lat., coriacea superne glabra subtus lepidota, basi rotundata; nervus medius subtus valde prominens, nervi secundarii approximati versus margines arcuati; petioli pollicares rugosi incrassati. *Flores* subsolitarii subsessiles. *Epicalyx* demum tripartitus segmentis coriaceis extus lepidotis intus pubescentibus lanceolatis erecto-patentibus demum recurvis. *Calyx* $1\frac{1}{4}$ poll. long., pentagonus basi intrusus infra medium tubulatus; sepala 5 coriacea utrinque pubescentia lanceolata demum recurva. *Petala* 0 vel decidua? *Andrœcium* e

phalangibus 5 constans. *Filamenta* ∞ gracilia curvata sepalis æquilonga; antheræ minutæ in apice filamenti solitariæ vel aggregatæ oblongæ poro apicali dehiscentes. *Staminodia* 0 vel decidua. *Ovarium* circa 5 lin. long. ovoideum 5-lobum, 5-loculare processibus subulatis carnosulis apice squamam orbicularem partitam gerentibus munitum. *Stylus* ? *Ovula* ∞ anatropa ascendentia (raphe juxta placentam sita) placentæ axili biseriatim affixa. *Fructus* non vidi.

Specimina imperfecta tantum examinavi.

2. B. ACUTIFOLIA, *Mast.*, sp. n. Foliis oblongis acutis vel acuminatis, basi rotundatis; floribus solitariis parvis; calyce trilobo, petalis (vel staminodiis ?) linearibus.

Borneo, Sarawak, *Beccari, 765, 2371 ?, 2600* !

Arbor. *Rami* teretes. *Ramuli* horizontaliter patentes, graciles, angulati. *Folia* $2\frac{1}{4}$–4 poll. long., $\frac{3}{4}$–2 poll. lat., superne glabra subtus ferrugineo-lepidota basi rotundata apice acuta; nervus medius prominens; petiolus $\frac{1}{2}$-poll., apice incrassatus. *Pedunculus* $\frac{1}{4}$-poll., *alabastro* ovoideo sub-3-lobo parum brevior. *Flos* intra epicalycem (primo clausum) breviter stipitatus. *Calyx* primo clausus demum trilobus, lobis valvatis ovatis acutis coriaceis lepidotis. *Petala* nulla vel 5–6. *Staminodia* (an petala ?) 10–12, seu 5–6, linearia petaloidea 1-nervia sepalis breviora. *Andrœcium* e phalangibus 3–5 constans; filamenta tenuissima glabra apice 1–5-antherifera, antheræ ut in congeneribus. *Ovarium* oblongum, compressum, lepidotum, abortu 1-loculare; ovula 2, ascendentia; stylus cylindratus glaber, ovario æquilongus, stigma capitatum subbilobum. *Fructus* haud vidi.

3. B. GRIFFITHII, *Mast. in Hook. Fl. Brit. Ind.* i. 352. Foliis obovato-oblongis cuspidatis; floribus parvis $\frac{1}{2}$-poll. diam. solitariis vel paucis cymosis, petalis linearibus.—Heteropyxis, *Griff. Not.* iv. 524; *Ic. Pl. Asiat.* t. 594.

Malacca (vide Tab. XV. fig. 29–39; Tab. XVI. fig. 40–42).

4. B. EXCELSA, *Korth. Verh. Nat. Gesch. Bot.* (1839), 258, t. 69; *Miq. Flor. Ind. Bat.* i. pt. 2, 168. Foliis oblongis acuminatis; floribus solitariis (parvis $\frac{1}{2}$-poll. diam.), petalis spatulatis.

Sumatra, Borneo.

NEESIA, *Blume.*

Neesia, Blume in Nov. Act. Cur. xvii. 75, t. 6; Endl. Gen. Pl. 990, n. 5308; Benth. et Hook. Gen. Pl. i. 213; Baill. Hist. Pl. iv. 159; Mast. in Hook. Flor. Brit. Ind. i. 352.

Esenbeckia, Blume, Bijdr. 118, non Kunth.

Cotylephora, Meissn. Gen. 36, Comm. 28.

The original species of this genus have a calyx which is dilated into a cushion-like prominence at the base. The Bornean species

now described has a calyx which does not show this peculiarity. The andrœcium consists of five phalanges, the constituent filaments of which bear each a single anther. The anthers in question are straight and either one-, or manifestly two-celled, it happening frequently that the central or terminal anther of each phalanx is two-celled, while the lateral ones are more or less obliquely one-celled. The ovary is covered with subulate bristles, but is destitute, so far as I have observed, of peltate scales. The ovules are numerous in each cell of the ovary; and the fruit is described as being like that of *Durio*; but the seeds are said to be destitute of aril.

1. N. STRIGOSA, *Mast.*, sp. n. Foliis amplis oblongis basi apiceque acutis, petiolo nervisque strigoso-pilosis; calyce basi haud dilatato.

Sarawak, *Beccari*, 2037, 3253!

Arbor. *Rami* teretes, cicatricati, strigosi. *Folia* 20 poll. long., 8 poll. lat., coriacea utrinque, præcipue subtus, stellatim pilosa; nervi secundarii arcuati subtus prominentes, flavo-strigosi; petioli 2-pollicares. *Stipulæ* deciduæ 2 poll. long., ½ poll. lat., foliaceæ dense stellato-pilosæ, lanceolatæ, 1-nerviæ. *Cymæ* contractæ densæ, axillares. *Bracteæ* rotundatæ concavæ coriaceæ strigosæ. *Bracteolæ* 3–4 coriaceæ cymbiformes florem omnino vestientes. *Calyx* campanulatus basi haud dilatatus apice primo clausus, demum in segmenta seu dentes 4–5 divisus, extus lepidotus, intus setosus. *Petala* 5 glabra, coriacea, suborbicularia, contorto-imbricata. *Andrœcium* e phalangibus 5 basi spatio brevi inseparatis constans; filamenta crassa glabra; antheræ biloculares loculis connectivo crasso late divergentibus curvatis. *Ovarium* oblongum 5-lobum 5-loculare, setis subulatis flavidis erectis vestitum; stylus ovario æquilongus pentagonus stigmate capitato terminatus. *Ovula* ∞ placentæ axili in quovis loculo biseriatim affixa. *Fructus* ignotus.

2. N. ALTISSIMA, *Blume, Nov. Act. Acad. Cur.* xvii. (1835), 83, t. vi. Foliis oblongis obtusis subglabris calyce basi demum dilatato.—Esenbeckia altissima, *Bl. Bijdr.* 119.

Java.

3. N. SYNANDRA, *Mast. in Hook. Brit. Fl. Ind* i. 352. Foliis cordato-oblongis obtusis puberulis calyce basi dilatato.

Malacca.

CŒLOSTEGIA, *Benth.*

Cœlostegia, Benth. in Benth. et Hook. Gen. Pl. i. 213; Baillon, Hist. Pl. iv. 160; Mast. in Hook. Fl. Brit. Ind. i. 352.

1. C. Griffithii, *Benth. l. c.*; *Mast. in Hook. Fl. Brit. Ind. l. c.*
Malacca (vide Tab. XVI. fig. 43–50).

The most interesting features of this genus consist in its peculiar five-pouched calyx, recalling that of some species of *Neesia*, but lobed. The staminal phalanges are opposite to the sepals, and somewhat perigynous, each phalanx consisting of a number of consolidated filaments surmounted by from 3 to 5 subglobose or oblong anthers, like those of *Boschia*, and not unlike those of *Plagiopteron*, or of some Stilaginaceæ. The fruit and seeds are as yet unknown.

Camptostemon, *Mast.*

Camptostemon, Mast. in Hook. Ic. Plant. (1872), tab. 1119.

This genus is chiefly remarkable among its near allies in its tubular andrœcium, which is like that of *Malva*, and which is not divided into separate phalanges as in other Durioneæ. Each filament supports a single two-celled anther. The ovary is two-celled, with a single ovule in each cell, and is surmounted by a long slender bifid style. The stigmatic lobes are two, each obscurely three-lobed. As to the style, the genus resembles *Dicellostylis*. The fruit is unknown.

The genus is curiously intermediate between Durioneæ and Malveæ.

1. C. Schulzii, *Mast. l. c.*
Port Darwin, North Australia, *Schulz*, 511.

Dialycarpa, gen. nov.

Flores dichlamydei bisexuales. *Thalamus* parvus planus. *Epicalyx* 0. *Calyx* e sepalis 4 ovatis acutis basi inseparatis, extus lepidotis. *Petala* 4–5 imbricata coriacea, sepalis parum breviora oblonga obtusa. *Andrœcium* e phalangibus 4–5 constans; filamenta ∞ gracilia, glabra singula 1-antherifera; antheræ biloculares loculis rectis basi latissime divaricatis rima longitudinali dehiscentibus. *Staminodia* 5 lineari-subulata inter stamina et carpella interjecta. *Pistillum* e carpellis 3 basi facile separandis stylorum apicibus autem connexis. *Ovaria* ovoidea extus lepidota, intus 2-ovulata ovulis pendulis; styli cylindrati apice coaliti. *Cocci* parvi indehiscentes seu forsan demum rima ventrali longitudinali dehiscentes, abortu 1-spermi. *Semen* pendulum triquetrum, raphe juxta placentam.

Arbor. *Rami* teretes virgati ascendentes. *Folia* petiolata lan-

ceolata coriacea glabra subtus lepidota. *Inflorescentia* axillaris paniculata. *Flores* minuti.

1. D. Beccarii, *Mast.*, sp. n. (*vide* Tab. XIV. fig. 1–12).

Sarawak, *Beccari*, 2473!

Folia 5 poll. long., 1½ poll. lat., basi apiceque acuta 1-nervia, petioli ½-pollicares. *Alabastra* ovoidea. *Flores* ¾-poll. diam.

The genus, so far as at present known, offers several points worthy of comment. The epicalyx or involucel so often met with in the Durionieæ is absent. The andrœcium consists of five phalanges, each consisting of numerous slender filaments, and each bearing a solitary anther whose two cells diverge widely at the base, and open longitudinally by a chink. Inside the fertile stamens are five subulate staminodes. The pistil consists of three scale-invested ovaries easily separable below, but connate by the apices of the styles. Each ovary is one-celled, with one or two pendulous ovules. The fruit consists of three dry rugose carpels, which were indehiscent in the young specimens examined by me, but which are probably more or less longitudinally dehiscent on the inner edge when ripe, and with one or two pendulous seeds. Whether the latter are albuminous or not, I have not been able to ascertain, owing to the imperfection of the specimens examined.

EXPLANATION OF THE PLATES.

Plate XIV.

Figs. 1–12. *Dialycarpa Beccarii*, Mast.

Fig. 1. Flower-bud, magnified.

2. Calyx laid open, magnified.
3. Petal, magnified.
4. Staminode, magnified.
5. Portion of a staminal phalanx with one anther, magnified.
6. Ovary, magnified.
7. Carpels in a more advanced stage than in fig. 6, and separate at the base, magnified.
8. Vertical section of carpel, showing ovules, magnified.
9. Similar section from an older carpel, with a solitary ovule, magnified.
10. Dorsal view of ripe carpels, magnified.
11. Ventral view of ripe carpels, magnified.
12. Vertical section of carpel. 12 *a*. Ripe seed, magnified.

PLATE XIV. (*continued*).

Figs. 13–16. *Durio Oxleyanus*, Griff.

Fig. 13. Phalanx, magnified.
14. Vertical section of anther, magnified.
15. Anther, magnified.
16. Vertical section of ovary, magnified. (All after a sketch by Dr. Maingay.)

Figs. 17–20. *Durio malaccensis*, Planch.

Fig. 17. Head of anthers.
18. Transverse section of anther, magnified.
19. Vertical section of ovary.
20. Spine-bearing peltate scale from the ovary, magnified. (After a sketch by Dr. Maingay.)

PLATE XV.

Figs. 21–28. *Boschia grandiflora*, Mast.

Fig. 21. Epicalyx, forced open and seen from the inside, nat. size.
22. Calyx, from the side, nat. size.
23. Phalanx, showing one head of anthers, slightly magnified.
24. Ovary, magnified.
25. Ovary and portion of andrœcium.
26. Transverse section of ovary.
27. Spine from ovary supporting a peltate scale.
28. Ovule, magnified.

Figs. 29–39. *Boschia Griffithii*, Mast.

Fig. 29. Bract of epicalyx, magnified.
30. Vertical section of flower, showing petals and staminodes, magnified.
31. Sepal, magnified.
32. Petal, magnified.
33. Filament with single anther. 37. The same more highly magnified.
34. Filament with group of anthers.
35. Group of anthers, seen from beneath, showing the connective or dilated end of the filament.
36. Filament, with two anthers, magnified.
37. Filament with a single anther, magnified.
38. Section through two anthers, magnified. (After Griffith.)
39. Vertical section of ovary, magnified.

PLATE XVI.

Figs. 40–42. *Boschia Griffithii*, Mast.

Fig. 40. Group of anthers flattened out, and seen from beneath, highly magnified. (After Griffith.)
41. Seed and arillus, slightly magnified.
42. Vertical section of ripe seed.

PLATE XVI. (*continued*).

Figs. 43–50. *Cœlostegia Griffithii*, Benth.

Fig. 43. Epicalyx, magnified.
44. Flower, from the side, magnified.
45. Calyx, from beneath, magnified.
46. Petal, magnified.
47. Vertical section of flower (petals removed), highly magnified.
48. Summit of stamen.
49. Transverse section of ovary.
50. Scale from outer surface of calyx, magnified 160 diameters.

Revision of the Genera and Species of Asparagaceæ.

By J. G. BAKER, Esq., F.L.S.

[Read November 5, 1874.]

(PLATES XVII. to XX.)

THE present paper is uniform with the three which I have already laid before the Linnean Society on sections of the natural order Liliaceæ, and embraces a description of all the tribes, genera, and species with baccate fruit. The Liliaceous alliance or order seems to fall most naturally into three suborders, as follows, outside of which stand half a dozen aberrant groups which contain not more than from one to a dozen species each, but which recede from the normal Liliaceous type so far that most of them have been treated as distinct natural orders by those systematists whose tendency has been, like Lindley, to increase the number of natural orders. The three suborders of typical Liliaceæ are:—1st, *Liliaceæ proper*, marked by introrse anthers, united styles, and capsular fruit with loculicidal dehiscence; 2nd, *Colchicaceæ*, with extrorse anthers, separated styles, and capsular fruit with septicidal dehiscence; and 3rd, *Asparagaceæ*, with baccate fruit. Of these the first is far the largest, as it includes 1200 or 1300 species. Colchicaceæ is much the smallest of the three, as the number of species is about 130. Of Asparagaceæ I have here characterized 8 tribes, 35 genera, and 259 species. To a certain extent the tribes in this baccate series run parallel with, and represent, the non-bulbous tribes in the capsular series. Colchicaceæ in the capsular series is represented in the baccate series by Streptopeæ, with 7 genera and 22 species. Of all the other Asparagaceæ, the anthers are

introrse, as in Liliaceæ proper. Yuccoideæ in the capsular series is represented in habit here by Dracæneæ; Aloineæ sparingly by Sanseviereæ; Anthericeæ by Tovarieæ; Hemerocallideæ by Convallarieæ. But to the tribe Asparageæ, which includes two fifths of the baccate series, with its abundant development of cladodia or phyllocladia, and its leaves turned into the likeness of bracts and produced at the base into a spur or spine, we have nothing analogous in Euliliaceæ or Colchicaceæ; and this represents the baccate series in its most specialized form. It seems to me that Aspidistreæ is best regarded as a mere tribe of this normal baccate series; and I have therefore included it here. The main point of structural difference in which it recedes from *Convallaria* is in the peculiar mushroom-shaped stigma; and my new genus *Gonioscypha* has entirely the habit of *Tupistra* in combination with a pistil of the ordinary Liliaceous character.

The small groups which I am disposed to look upon as aberrant tribes of Liliaceæ, over and above the three great suborders just indicated, are:—(1) *Liriopeæ* (I write Liriopeæ instead of Ophiopogoneæ, because the former name takes precedence on the ground of many years' priority), in which the ovary does not swell, and the ovules soon burst it, ripening into seeds in the open air, as in *Caulophyllum* in Berberidaceæ; *Liriope* itself only differs in this point from Anthericeæ; but the two other genera, *Fluggea* and *Peliosanthes*, recede from proper Liliaceæ by their half-inferior ovaries. (2) *Conanthereæ*, mostly Anthericoid in habit, a connecting-link between Liliaceæ proper and Amaryllidaceæ by their partly adnate ovaries, like *Pitcairnia* between Bromelieæ and Tillandsieæ. (3) *Gilliesieæ*, with an herbaceous, often irregular perianth, and usually an irregular development of stamens and staminodia—connected with Euliliaceæ by *Solaria* (*Symea*), which has a regular 6-partite green perianth and three symmetrical stamens with a very obscure tooth between each. (4) *Stemoneæ* (Roxburghiaceæ, Lindl.), a small group marked by the dimerous symmetry of the flower, two-valved capsules, with basilar placentation, long funiculi, penicillate at the apex, peculiar anthers, and broad stalked leaves with three to seven nerves connected by fine close transverse venules. (5) *Scoliopeæ*. One species only, with a one-celled ovary with parietal placentation, extrorse anthers, and inner segments of the perianth much narrower than the outer.

Most recent writers (Kunth, Endlicher, Le Maout and Decaisne, &c.) have combined Smilaceæ with Asparagaceæ; but it seems to me that it is best to follow Lindley in considering Smilaceaæ a distinct natural order, and that he has included in it just those genera that naturally and properly belong to it. The best mark of structural difference is, that Smilaceæ has orthotropous, and all the Liliaceæ, as above indicated, have more or less distinctly marked anatropous * ovules. Add to this the adnate basifixed anthers of Smilaceæ, their minute polygamous flowers arranged in umbels, with articulated pedicels fitting into the minute bract, like a ball into a socket, their zigzag, usually woody, often prickly stems, their peculiar stipular tendrils, and stalked, rigid, exogen-like leaves, with few distant main veins connected by reticulated venules, and it seems to me that we have a combination of characters quite sufficient to warrant us in separating Smilaceæ as an order from these baccate Liliaceæ. I have therefore not included them in this present paper; and even if I felt disposed to regard these difference as being of not more than tribal value, I should still not have dealt with them, from a hope that at a not very distant date they will be taken in hand and monographed by M. Alphonse De Candolle.

The small group of Philesiaceæ (containing only two monotypic genera which have been hybridized) agrees with Smilaceæ in structure to a large extent. The ovary is one-celled, with three parietal placentas, and becomes baccate in fruit; and the ovules are nearly or quite orthotropous. The flower is hermaphrodite, large, and showy; and in *Philesia* itself there is a distinct separation of the perianth into two rows quite dissimilar in size and texture. The anther is basifixed in *Lapageria*, versatile in *Philesia*. The structure of the wood, Dr. Hooker has shown, closely resembles that of *Smilax*. The leaves are stalked in both genera, one-nerved in *Philesia*, five-nerved in *Lapageria*, with the veinlets as reticulated as in an Exogen. So that, on the whole, leaving out of count the placentation and cohesion of the carpels, Philesiaceæ may be held to be a connecting link between Smilaceæ and this present baccate suborder of Liliaceæ.

Taking *seriatim* the organs of Asparagaceæ, the following are the principal points worthy of note:—

* The ovule of *Convallaria* has often been wrongly described and figured as orthotropous. See Theod. Nees von Esenb. 'Flor. Germ. Monocot.' vol. ii. *Polygonatum*, *Convallaria*, and *Maianthemum*.

Root and Rootstock.—Bulbous rootstock and baccate fruit are never combined; so that in this respect the affinity of Asparagaceæ is entirely with the non-bulbous halves of the two capsular suborders:—in Liliaceæ proper with Hemerocallideæ, Anthericeæ, Yuccoideæ, and Aloineæ, not with Hyacintheæ, Scilleæ, Allieæ, and Tulipeæ; and in Colchicaceæ with *Uvularia*, *Disporum*, *Schelhammera*, and *Veratreæ*. We have good examples of thick short-creeping Iris-like rhizomes in *Polygonatum*, *Sanseviera*, and the Aspidistreæ, and of slender thread-like rhizomes, stoloniferous, with long internodes, in *Maianthemum bifolium*, *Tovaria trifolia*, *Convallaria maialis*, *Reineckia carnea*, *Kruhsea*, and *Callixene*. How quickly the Lily of the Valley multiplies by vegetative reproduction in a favourable place every gardener knows.

Stem.—Dr. Hooker showed clearly and fully long ago, in 'Flora Antarctica' (vol. ii. pp. 355, 356), on what an unsafe basis Lindley's separation of Dictyogens from Endogens was grounded, and that there is really no material difference between *Smilax* on the one hand, *Luzuriaga* and *Callixene* (here placed as baccate Liliaceæ) on the other, and the two genera of Philesiaceæ. On this point reference may also be made to Grisebach's remarks in the great 'Flora Brasiliensis' of Martius and Eichler (vol. iii. p. 2). As regards stem, habit, and duration there is great variety in the suborder. In the first tribe, Dracæneæ, which contains fifty species, the stems are all more or less decidedly fruticose or arborescent. The great Dragon-tree of Teneriffe is said to have had a trunk that reached a height of 60 and a thickness of 15 feet; but this must only be regarded as an exceptional maximum. In *Lomatophyllum* there is a short, simple or forked trunk, like that of *Aloë socotrina* or *purpurascens*. The tribe Asparagaceæ abounds in spiny climbing shrubs, and in the arid tracts of the Cape yields also many suberect thorny bushes. We have also unarmed shrubby climbers in *Eustrephus* and *Geitonoplesium*, and small slender shrubs with branched leafy stems in *Drymophila*, *Callixene*, and *Luzuriaga*. Amongst perennial herbs, the scapose habit, so common in the capsular Liliaceæ, is very rare, but is represented by *Convallaria* and *Speirantha*. *Clintonia* is subscapose, with a tuft of broad leaves near the base of a long stem, and only a single small bract higher up. In several genera there are herbaceous stems, bare in the lower half, and distichously alternately leafy in the upper half. This type is represented in a simple stem in *Tovaria* and *Polygona-*

tum, and in a stem once or twice dichotomously forked in *Streptopus*, *Disporum*, and *Prosartes*.

Proper Leaves.—The narrow fleshy Hyacinth type of leaf, like the Hyacinth bulb, is entirely absent from the suborder. Texture ranges from membranous to rigidly coriaceous or coriaceo-carnose. In *Lomatophyllum* we have an ensiform completely Aloe-like leaf, narrowed gradually to a point, deeply channelled down the face, with a distinct red margin armed with close minute teeth. In *Sanseviera* there are three distinct types of leaf, all large, long, and narrow:—the *guineensis* type thin, but hard and horny, deeply channelled down the face; the *zeylanica* type ensiform, broadly rounded on the back, $\frac{1}{4}$–$\frac{1}{2}$ inch thick in the middle, hard and rigid, yielding copious hemp-like fibres; and the *cylindrica* type, a complete club, without any flattening at all, circular in horizontal section, marked only with faint vertical grooves. In the Dracæneæ there is great variety in the leaf and its shape and veining; and whether it is stalked or sessile furnishes great help in discriminating the groups and species. There is every gradation between long narrow sessile ensiform leaves densely aggregated in rosettes, as in *Dracæna Draco*, and a short oblong blade, spaced upon the branch, narrowed into a distinct petiole, which is dilated and amplexicaul at the base, as in *Dracæna elliptica*. In the herbaceous tribes we have the closely veined dry Anthericoid type of leaf represented in *Dianella*, *Reineckia*, and *Theropogon*. In *Dianella* there is a clasping sheath like that of a grass or *Carex*, and the edge and keel of the blade are often minutely serrated. We have copious, small, firm, lanceolate or oblong leaves distichously spaced along the stem, and sometimes articulated at the base, in the Australian and South-temperate-American slender shrubby genera *Callixene, Drymophila, Eustrephus*, *Geitonoplesium*, and *Luzuriaga*; larger thinner oblong alternate stem-leaves in *Polygonatum*, *Tovaria*, *Disporum*, and *Kruhsea*; and cordate-amplexicaul stem-leaves of similar size, texture, and arrangement in *Prosartes* and *Streptopus*. In these herbaceous perennials distinct petioles occur in *Maianthemum bifolium* and *Tovaria divaricata*. In these broad-leaved herbaceous perennials there are at least four distinct types of leaf-veining:—(1) uniform close parallel veins, curving outwards equally from the base and apex of the leaf, as in the common Lily of the Valley; (2) like the last, but two or three veins on each side of the midrib more pronounced and the intermediate ones fainter but close,

so as to leave no room for obvious transverse venules—a plan shown in *Tovaria*, *Streptopus*, and *Disporum*; (3) More distant veins connected by distinct, short, parallel, transverse venules, as shown in *Prosartes*, *Hylonome*, and *Tovaria nervulosa*; and (4) a distinct network of venules between a few digitate main straight veins which spring from the apex of the petiole, the *Smilax* and *Lapageria* type, shown here only in *Medeola*. In the broader-leaved Dracæneæ and Aspidistreæ a large oblanceolate or oblanceolate-oblong leaf is common, with close oblique veins springing from the midrib and not returning. The phyllotaxis of the leaves of the suborder shows great variety. Generally it is alternate, the leaves varying in closeness from a dense rosette like that of a *Yucca* to a spaced alternate distichous arrangement, as shown in the common Solomon's Seal. In *Polygonatum* we have the genus separated into three sections by leaf-arrangement: in one group they are alternate, in another opposite, and in a third verticillate. In *Medeola* we have two distant whorls, from the uppermost of which springs the umbel of flowers. Leaves mottled with white occur in *Dracæna* and *Sanseviera*, and distinct red borders to the leaf in the same genera; and the wonderful richness and variety of colour shown in the leaves of *Taetsia* (*Cordyline*) *terminalis* has made the plant very popular of late years for decorative purposes.

Leaves, Cladodia, and Phyllocladia of Asparageæ.—By far the most curious structural peculiarity shown in the suborder is that which marks the tribe Asparageæ, which contains four genera and upwards of a hundred species. Here the leaves are changed into the likeness of small scariose bracts; and subulate or flattened sterile branches are developed, which in *Ruscus* and *Semele* bear the flowers. The blade of the leaf thus modified is always a minute lanceolate or deltoid membrane, sessile and adpressed to the branch on which it grows, closely resembling an ordinary Liliaceous bract. In *Ruscus* these bract-like leaves soon fall; but in *Asparagus* they persist, and are always more or less distinctly spurred at the base, the spur varying from a mere soft conical point, as shown in *Asparagus officinalis*, to a hard, woody, pungent, spreading or deflexed spine, reaching half an inch in length, in *A. albus*. In the arrangement, shape, and texture of these barren branches there is great variety. Kunth calls them all cladodia, whether they are subulate and branch-like, as is usual in *Asparagus*, or flattened and leaf-like as in *Ruscus*. Although they re-

present the same organ, yet, for the sake of emphasizing the difference in form, I have here restricted the term cladodia to the branch-like type, and for the leaf-like type have used the term phylloclade. Using the words in these senses, the cladode is peculiar to *Asparagus*, is usually, but not quite invariably, fascicled, sometimes in clusters of twenty or thirty on the old woody stems, and never actually bears flowers, though they frequently grow from its axil. In *Asparagus*, including *Myrsiphyllum*, we have these cladodia in a large proportion of the species; but linear and ovate phylloclades also occur; and it is to a very large extent by characters furnished by the shape, size, and arrangement of these organs that we are enabled to distinguish the nearly one hundred species from one another. In *Asparagus* the phylloclades are sometimes solitary and sometimes fascicled, and never bear flowers. In *Ruscus* and *Semele* they are always solitary, bearing the flowers in the former genus from the centre of the back, and in the latter from the edges. How like these phylloclades are to leaves proper is shown by the fact that in one of the Cape species of *Ruscus* described by Thunberg they are not phylloclades at all, but true leaves; and that such is the case has only been noted within the last few years, and the plant made the type of a new genus, called *Hylonome* by Webb and *Dictyopsis* by Dr. Hooker and Dr. Harvey. *Danaë*, a third Asparagoid genus included by Linnæus under *Ruscus*, has phyllocladia in combination with racemose flowers. In *Asparagus*, I may note in passing, there are at least three different kinds of spine:—the indurated spur of the modified leaf, as shown in *albus*; indurated pungent-pointed cladodes, as shown in *horridus*; and short, spine-like, sterile, real branches, as shown in *stipularis*. And it is a fact familiar to every one that the aculei of *Ruscus aculeatus* are the indurated pungent tips of its phylloclades.

Inflorescence.—In inflorescence also there is great variety in the suborder. In *Aspidistra* and *Plectogyne* the flowers spring singly on very short peduncles from a ginger-like rhizome. In *Tupistra*, *Reineckia*, and *Rohdea* they are arranged in dense spikes. *Convallaria*, *Theropogon*, and *Speirantha* furnish good illustrations of a typical, simple, centripetal raceme. Racemes passing into panicles mark the first two tribes. In *Dracæna* and *Sanseviera* the pedicels are usually fascicled. In one group of *Dracæna* the racemes are congested into dense heads; and in *D. fragrans* there are numerous distant dense heads upon a forked rachis. Ample

panicles are also found in *Dianella* and *Tovaria*. In *Tovaria* there are three types of inflorescence—a raceme with solitary pedicels, a raceme with fascicled pedicels, and a panicle. The zigzag rachis of the inflorescence in certain species of *Tovaria* is peculiar. Umbels from the axils of fully developed leaves mark many genera, sometimes, as in *Polygonatum* and *Tovaria*, stalked, but more frequently sessile, sometimes, as in *Prosartes*, produced from the axil of the upper leaf only; and sometimes, as in *Kruhsea*, the umbel is reduced down to a single flower. In *Clintonia* there is an umbel or solitary flower at the end of a long scape; and in some of the species axillary umbels also developed at a distance from the terminal one. In *Asparagus* the rule is that the flowers spring in pairs or umbels from the axils of the cladodia. In one group the flowers are arranged in copious racemes, normally without cladodia; but in these there is a tendency for the cladodia to spring from the same nodes as the flowers in abnormal specimens or from non-floriferous nodes above the raceme; so that for the purposes of diagnosis this character, striking as it seems, needs to be used with caution. Pedicels in the suborder, as in Anthericeæ, are usually articulated, sometimes at the base, sometimes at the tip, sometimes in the middle. A very curious pedicel occurs in *Streptopus amplexifolius*. The flowers spring singly from the axils of the leaves, and have a spreading, cernuous, filiform pedicel 1–2 inches long, which is straight in the lower and flexuously contorted in the upper half. Except where the umbel springs from the axil of a fully developed leaf, bracts are usually present in the suborder as minute, persistent, scariose, lanceolate, or deltoid membranes. Two curious developments of bract may be noted. In *Cordyline* and *Cohnia* a minute involucre subtends each solitary pedicel, composed of three deltoid scales, of which the two nearest the branch are more or less thoroughly connate. In *Ruscus Hypoglossum* an umbel of flowers springs from the centre of the back of the phylloclade, as in *R. aculeatus*, which is subtended by a bract just like the phylloclade in shape and texture, but much smaller; and inside this are copious minute scariose bracteoles at the base of the pedicels.

Perianth.—In the flower-wrappers of the suborder there is not much that is noticeable. All the three main suborders of Liliaceæ and two of the aberrant tribes (Gilliesieæ and Liriopeæ) contain genera with both gamophyllous and polyphyllous perianths. If any one wishes to see how near two genera may be which yet re-

present these two types which in Exogens we place as subdivisions of primary value, let him compare *Taetsia* (*Cordyline*) with *Cohnia*, *Colchicum* with *Merendera*, or *Liriope* with *Fluggea*. In Asparagaceæ the gamophyllous series includes 3 tribes, 14 genera, and nearly 100 species. Generally the perianth is cylindrical, slit down sometimes into shallow oblong, sometimes into deep, ligulate equal, blunt lobes; but it is campanulate in *Convallaria* and the Aspidistreæ. In the polyphyllous genera the segments are usually permanently connivent in a funnel or cup; but they spread horizontally in some *Tovariæ* and *Asparagi*. None of the genera shows any decided irregularity in the perianth-segments, except that the inner three in *Eustrephus* are fringed, and there is no distinct gland or groove down their faces, as is so common in the *Tulipeæ*. The spurs of some of the *Dispora* are peculiar. Departures from trimerous symmetry occur in *Maianthemum*, *Aspidistra*, and *Plectogyne*. In the former there are four and in the latter usually eight segments to the perianth, an equal number of stamens, and half as many carpels. The individual flowers in the suborder are usually small, and either white or greenish white or greenish yellow. In *Dianella* they are bright blue, in the *Aspidistreæ* lurid purple, in *Eustrephus*, *Geitonoplesium*, and some species of *Polygonatum* and *Tovaria* a brighter lilac or purple; and in *Lomatophyllum* a blended bright red and yellow, like an *Aloë*; but there is nothing here that can compare in floral effect with many members of the two other Liliaceous suborders.

Stamens.—There are three types of anther in the suborder, which I have used to mark tribes:—extrorse versatile, with longitudinal dehiscence; introrse versatile, with longitudinal dehiscence; and basifixed, dehiscing by terminal pores. Beyond this there is little noticeable in the stamens of these plants. The anther-cells of *Streptopus amplexifolius* are each produced into a distinct horn at the tip beyond the connective. Staminodia are unknown in the suborder; and the filaments never become dilated or petaloid. In *Ruscus* three out of the six anthers are abortive; and, as already noted, the stamens in *Maianthemum*, *Aspidistra*, and *Plectogyne* follow the perianth in its departure from ordinary endogenous symmetry. In *Dianella* there is a curious yellow struma below the basifixed anthers and a geniculus in the filament. In *Ruscus*, *Semele*, and *Danaë* the filaments are united into a corona. In the polyphyllous genera the stamens are either hypogynous, or attached to the perianth-segments just

above the base. In the gamophyllous genera they usually spring from the throat of the tube (*Dracæna*, *Cordyline*, *Sanseviera*); but they are hypogynous and slightly declinate in *Lomatophyllum*, as in *Aloë*, and inserted at the middle of the tube in *Polygonatum* and the Aspidistreæ. In the tribe Asparageæ the flowers are frequently polygamous. Kunth calls them dioicous, but, from the context, probably means polygamous. At any rate I am not aware that they are ever really dioicous. In *Asparagus officinalis*, in which this polygamous tendency is carried out to its fullest extent, there are always filaments and rudimentary anthers in the female flowers, and a small three-celled ovary (which sometimes contains an ovule or two) in the male flowers; and it is curious to note that the perianth in the two kinds is entirely different in size, that of the male flower being much larger than in the berry-bearing flower. I have not paid any attention to the pollen. Kunth makes a new genus (*Asparagopsis*) for the hermaphrodite species of *Asparagus*; but as they agree completely with the polygamous species in habit and all other characters, I have not followed his lead in this matter.

Pistil.—The ovary and berry are remarkably uniform through the whole of the suborder; and I have not noticed any special deviation from the regular Liliaceous type in the seed. In style and stigma there is greater variety. *Medeola* and *Drymophila* have the three styles separate down to the base; but here free styles are not, as in Colchicaceæ, correlated with extrorse anthers. In *Sanseviera*, *Dracæna*, and many other genera the styles are completely joined, and the stigma capitate; *Kruhsea* has a capitate sessile stigma. In *Cordyline*, *Polygonatum*, *Streptopus*, and many other genera the style is shortly tricuspidate. The peculiar, large, plicate, mushroom-shaped stigma of the Aspidistreæ is very curious.

I give a Plate (Pl. XVII.) to show the structure of the stigma and its position relative to the other parts of the flower in *Plectogyne*. The stigma acts as a lid that shuts in the top of the tube as completely as the lid of a box. In this tube are placed the eight anthers; and how fertilization is effected I am at a loss to understand. This stigmatic plate bears on the top eight deep troughs which radiate from a raised papillose centre to the edge, the troughs and walls that separate them being both pressed tightly against the surface of the perianth at the base of the reflexed lobes. Inside the box are the eight stamens; and its walls

are dusted all over with a copious supply of pollen. But the question is how it gets conveyed to the stigma. On turning the stigmatic plate upside down, four little holes are visible; and it is perhaps through these that the pollen is carried by minute insects. But even if it be so, the whole arrangement seems very peculiar, because the stigmatic lid seems to shut in the anthers so thoroughly out of the way of both wind and insects and interposes an impassable barrier to the pollen being carried without some help. Although the plant is not uncommon in our greenhouses, I am not aware that it ever produces fruit.

Sources consulted.—In drawing up the synopsis I have used mainly the material furnished by the three large public London herbaria. Besides these, I have been materially indebted to the collections of M. Alphonse De Candolle and Trinity College, Dublin, both kindly lent to me for leisurely examination and comparison at home, the latter through the good offices of Professor Percival Wright. For the identification of the types described by Thunberg in the 'Flora Capensis,' I have been allowed the loan of his specimens from the Upsala Museum through the courtesy of Professor Theodore Fries.

Size of Genera.—In this suborder, unlike the other two, there are numerous small and monotypic genera. Out of 35 genera here described, 18 are monotypic, and only 5 contain more than 10 species each. These are, in order of size:—*Dianella*, 11 species; *Tovaria* (*Smilacina*), 18; *Polygonatum*, 23; *Dracæna*, 38; and *Asparagus*, 98.

Genera and Species excluded.—The principal genera and species placed here by Kunth and other authors which I have had to exclude altogether are:—*Dasylirion*, which I have placed in Liliaceæ proper by the side of *Yucca* and *Xanthorrhœa*; *Veratronia* of Miquel, a genus founded upon a brief description by Jack, without a specimen having been seen, which is not a baccate Liliaceous plant at all, but a Palm; *Duchekia* of Kosteletsky, founded on *Dracæna hirsuta* of Thunberg and Dallmann, which an examination of the original type specimen shows to be *Palisota thyrsoidea* in Commelynaceæ; *Dracæna graminifolia* of Linnæus, which is *Liriope*; and *Dianella dubia*, H., B. & K., which is identical with *Anthericum coarctatum* of Ruiz and Pavon, and belongs to Anthericeæ near *Stypandra*, where it was classified by Robert Brown.

Geographical Distribution.—The bulbous and succulent tribes of Liliaceæ, which together perhaps make up half the order, belong

to the geographic type which M. Alphonse De Candolle calls *Xerophiles*, and have usually a well-defined restricted geographic area. Neither of these propositions can be affirmed of Anthericeæ and the suborder with which we are now dealing; for it is scattered throughout the whole world except high northern latitudes; and very few of the tribes are concentrated in a restricted definite geographical area as a whole. It is most sparse in Polynesia and Tropical America, and belongs far more to the Old than the New World. 8 genera (two only of which are peculiar) and about 20 species are American; 240 species and all the genera but these two inhabit the Old World. Taking the tribes one by one, Dracæneæ, with 51 species, are concentrated in the tropics of the Old World. They run out a little beyond the tropic in both directions, namely to the Himalayas, New Zealand, and the Cape. One species only belongs to Tropical America. The Aloe-like Asparagaceæ, tribe Sanseviereæ, with 13 species, are mainly Tropical African. The Convallarieæ (26 species) are spread through the north temperate zone of both hemispheres, one belonging to the Cape. The Aspidistreæ (7 species) belong entirely to Japan, China, and the East Himalayas. *Maianthemum* and *Streptopus amplexifolius* belt the world in the north temperate zone. *Tovaria stellata*, common and widely spread in North America, reappears in Norway, but is not known in Siberia or elsewhere in Europe. *Tovaria*, with 18 species, has this *stellata* in Norway, and all the rest in the Himalayas, Eastern temperate Asia, Japan, and North America, reaching down to the mountains of Mexico and Guatemala. *Drymophila*, *Geitonoplesium*, *Eustrephus*, *Luzuriaga*, and *Callixene*, all similar in habit and leaf, belong to Australia, New Zealand, and South temperate America. The other Streptopeæ are all either North-American or East-Asian, except *Streptopus amplexifolius*. *Medeola* (1 species) and *Prosartes* (3 species) are the two genera that belong exclusively to North America. The curious genus *Clintonia*, widely spread in North America, has outlying representatives in East Siberia and the Himalayas. The great tribe Asparageæ, with 100 species, is quite confined to the Old World, being most concentrated at the Cape, but with many representatives both in Tropical Africa and Tropical Asia, and a few in Europe, Siberia, and Japan.

CLAVIS TRIBUUM ET GENERUM.

Series III. ASPARAGACEÆ. *Fructus baccatus. Antheræ introrsæ rarius extrorsæ. Frutices vel herbæ nunquam bulbiferæ.*

Tribus I. DRACÆNEÆ. *Frutices foliis propriis, floribus hermaphroditis, antheris introrsis.*

1. DRACÆNA. Perianthium gamophyllum. Ovula in loculo solitaria. Pedicelli basi haud involucrati, inferiores fasciculati. *Regiones calidiores veteris orbis.*

2. CORDYLINE. Perianthium gamophyllum. Ovula in loculo plura. Pedicelli solitarii bracteolis tribus involucrati. *Regiones calidiores totius orbis.*

3. COHNIA. Perianthium 6-partitum. Ovula in loculo plura. *Mauritius, Borbonia, Nova Caledonia.*

Tribus II. SANSEVIEREÆ. *Suffrutices coriaceo-carnosæ, foliis propriis, floribus hermaphroditis, antheris introrsis.*

4. SANSEVIERA. Stamina recta ad faucem tubi inserta. Ovula in loculo solitaria. *Reg. calid. veteris orbis.*

5. LOMATOPHYLLUM. Stamina hypogyna declinata. Ovula in loculo plura. *Insulæ Mascaranenses.*

Tribus III. CONVALLARIEÆ. *Herbæ foliis propriis, floribus gamophyllis hermaphroditis, antheris introrsis.*

6. REINECKIA. Acaulis. Perianthium tubulosum segmentis elongatis. Stamina faucialia. *China et Japonia.*

7. CONVALLARIA. Acaulis. Perianthium campanulatum, segmentis brevibus. Filamenta profunde perigyna. *Regio borealis temperata totius orbis.*

8. POLYGONATUM. Caulescentes. Perianthium tubulosum segmentis brevibus. Stamina alte perigyna. *Regio borealis temperata totius orbis.*

9. HYLONOME. Caulescens. Perianthium oblongum segmentis brevibus. Filamenta profunde perigyna. *Cap. B. Spei.*

Tribus IV. TOVARIEÆ. *Herbæ foliis propriis, floribus hermaphroditis, perianthii segmentis liberis, antheris introrsis longitudinaliter dehiscentibus.*

* *Acaules.*

10. THEROPOGON. Antheræ basifixæ filamentis brevibus. Ovula in loculo 10–12. Folia graminoidea. *Himalaya.*

11. SPEIRANTHA. Antheræ versatiles filamentis elongatis. Ovula in loculo 3–4. Folia lata. *China.*

** *Caulescentes erectæ.*

12. MAIANTHEMUM. Flores 2–4-meri. Styli coaliti. *Regio temperata bor. totius orbis.*

13. TOVARIA. Flores trimeri. Styli coaliti cuspidibus brevibus liberis. *Regio temp. bor. totius orbis, Mexico, Guatemala.*

14. DRYMOPHILA. Flores trimeri. Styli 3 omnino liberi. *Australia.*

*** *Caulescentes volubiles.*

15. GEITONOPLESIUM. Perianthii segmenta interiora haud fimbriata. *Australia, Polynesia.*

16. EUSTREPHUS. Perianthii segmenta interiora fimbriata. *Australia.*

Tribus V. DIANELLEÆ. *Herbæ foliis propriis, floribus 6-partitis hermaphroditis, antheris poris apicalibus dehiscentibus.*

17. LUZURIAGA. Folia parva oblonga. Filamenta nuda. *Chili et Peruvia.*

18. DIANELLA. Folia graminoidia. Filamenta stupposa. *Australia, Nova Zealandia, reg. calid. Asiæ, Mauritius.*

Tribus VI. ASPIDISTREÆ. *Herbæ acaules foliis latis. Perianthium gamophyllum carnosum hermaphroditum limbo interdum 8-fido. Antheræ introrsæ longitudinaliter dehiscentes. Stigma sæpissime magnum peltatum.*

** *Flores ex rhizomate solitarii, limbo 8-fido.*

19. ASPIDISTRA. Ovula in loculo gemina. Stigma obscure lobatum. *China, Himalaya orientalis.*

20. PLECTOGYNE. Ovula in loculo 4–6. Stigma distincte 8-lobatum sinibus alternis calcari appendiculatis. *Japonia.*

** *Flores dense spicati; spicæ pedunculis nudis instructæ.*

21. TUPISTRA. Folia petiolata. Tubus campanulatus antheris infra faucem sessilibus. Stigma magnum peltatum, stylo elongato. *Himalaya orientalis.*

22. GONIOSCYPHA. Folia petiolata. Tubus oblongo-cylindricus

catus antheris ad faucem sessilibus. Stigma parvum capitatum stylo elongato. *Bootan.*

23. CAMPYLANDRA. Folia sessilia. Tubus campanulatus antheris infra faucem decurvatis, filamentis brevibus crassis præditus. Stigma peltatum, stylo elongato. *Himalaya orientalis.*

24. ROHDEA. Folia sessilia. Tubus campanulatus, antheris ad faucem sessilibus. Stigma peltatum, stylo subnullo. *Japonia.*

Tribus VII. STREPTOPEÆ. *Herbæ foliis propriis, floribus hermaphroditis sæpissime 6-partitis, antheris extrorsis longitudinaliter dehiscentibus.*

* *Styli a basi distincti.*

25. MEDEOLA. Genus solum. *Amer. bor.*

** *Stylus filiformis apice tricuspidatus.*

26. CLINTONIA. Herbæ longe scaposæ pilosæ foliis latis basalibus. *Regio temp. bor. Asiæ et Americæ.*

27. PROSARTES. Herbæ pilosæ caulibus ramosis foliatis, foliorum venulis transversalibus distinctis. Ovula 2 pendula vel plura. *America borealis.*

28. DISPORUM. Herbæ glabræ caulibus ramosis foliatis, foliorum venulis transversalibus brevibus occultis. Ovula gemina ascendentia. *India orientalis, Asia orientalis.*

29. STREPTOPUS. Herbæ caulibus ramosis foliatis, foliorum venulis transversalibus brevissimis occultis, foliis membranaceis amplexicaulibus. Ovula plura. *Regio temp. bor. totius orbis.*

*** *Stylus filiformis apice integro.*

30. CALLIXENE. Suffrutices ramosæ gracillimæ foliis rigidulis basi articulatis. *Nova Zelandia, Chili, Patagonia.*

**** *Stylus nullus. Stigma peltatum.*

31. KRUHSEA. Perianthium basi gamophyllum, segmentis acuminatis late patulis. *Siberia orientalis.*

Tribus VIII. ASPARAGEÆ. *Herbæ vel suffrutices caulescentes floribus sæpe polygamis, foliis parvis scariosis bracteiformibus, ramis sterilibus multis subulatis vel applanatis (cladodia vel phyllocladia) præditæ, antheris introrsis longitudinaliter dehiscentibus.*

32. ASPARAGUS. Stamina 6 libera. Perianthium 6-partitum. Flores hermaphroditi vel polygami. *Orbis vetus præsertim Cap. B. Spei.*

33. Ruscus. Stamina 3 monadelpha. Perianthium 6-partitum. Flores polygami e costa faciei inferioris cladodiorum orti. *Europa et regio medit.*

34. Semele. Stamina 6 monadelpha. Perianthium 6-partitum. Flores polygami e margine cladodiorum orti. *Insulæ Canarienses.*

35. Danaë. Stamina 6 monadelpha. Perianthium alte gamophyllum. Flores racemosi hermaphroditi. *Caucasus, Persia, Græcia.*

Tribus I. Dracæneæ.

1. Dracæna, *Vand.*

Vandelli in Linn. Gen. no. 1256; *Juss. Gen.* 40; *Thunb. et Dallm. Diss.* (anno 1808); *Endlich. Gen.* no. 1167; *Kunth, Enum.* v. 3; *Regel, Gartenf.* 1859, 329, 1871, 132; *Revis. Cratæg. &c.* 33; *K. Koch, Wochen.* 1867, 235; *Planch. Fl. des Serres*, vi. 132.—Cordyline, *Planch. Fl. des Serres*, vi. 136; *F. Muell. Frag.* v. 194, *non Commers.*—Stoerkea et Œdera, *Crantz, Diss.* (*Vindob.* 1768).—Terminalis, *Medic. Theod.* 83.—Pleomele, *Salisb. Gen.* 74.

Perianthium tubulosum albidum corollinum segmentis ligulatis æqualibus tubo longioribus vel brevioribus. *Stamina* 6 ad faucem tubi uniseriata, filamentis filiformibus vel applanatis segmentis paulo brevioribus, antheris oblongis dorsifixis apice et basi emarginatis introrsum dehiscentibus. *Ovarium* sessile ovoideum triloculare ovulis in loculo solitariis erectis; stylus filiformis elongatus rectus; stigma capitatum obscure trilobum sæpissime exsertum. *Bacca* trilocularis vel sæpe abortu 1–2-locularis, seminibus in loculo solitariis magnis dorso convexis, albumine corneo, testa membranacea nigra vel brunnea. *Arbores vel suffrutices stolonibus nullis, trunco basibus foliorum delapsorum tessellato, foliis arundinaceo-coriaceis ensiformibus vel latis sessilibus vel petiolatis laxe vel dense rosulatis, floribus paniculatis vel capitatis bracteis haud involucrantibus pedicellis articulatis sæpe fasciculatis interdum glomerulatis. Regiones calidiores veteris orbis.*

I. Stirps *D. Draconis.* Folia conferta sessilia ensiformia ascendentia.

1. *D. Finlaysoni.* 2. *D. marginata.*
3. *D. Kirkii.* 4. *D. aurea.*

5. *D. Mannii.* 6. *D. angustifolia.*
7. *D. Draco.* 8. *D. Hookeriana.*
9. *D. umbraculifera.* 10. *D. Saposchnikowi.*
11. *D. arborea.*

II. Stirps *D. fragrantis.* Folia conferta sessilia oblanceolata ascendentia.

12. *D. Perottetii.* 13. *D. Porteri.*
14. *D. timorensis.* 15. *D. fragrans.*
16. *D. concinna.*

III. Stirps *D. reflexæ.* Folia sublaxa patentia sessilia ensiformia vel oblanceolata.

17. *D. cincta.* 18. *D. stenophylla.*
19. *D. reflexa.* 20. *D. Kochiana.*
21. *D. fruticosa.*

IV. Stirps *D. spicatæ.* Folia petiolata contigua oblanceolata. Flores racemosi vel paniculati.

Asiaticæ petiolis brevibus: 22. *D. spicata.*
23. *D. Thwaitesii.*
24. *D. atropurpurea.*
Africanæ petiolis longis: 25. *D. humilis.*
26. *D. thalioides.*

V. Stirps *D. ellipticæ.* Folia petiolata contigua oblonga. Flores racemosi vel paniculati.

27. *D. elliptica.* 28. *D. densiflora.*
29. *D. Fontanesiana.* 30. *D. Goldieana.*
31. *D. glomerata.*

VI. Stirps *D. ovatæ.* Folia petiolata contigua lanceolata vel oblonga. Flores in spicam simplicem terminalem dense capitati. *Afr. trop. occid.*

32. *D. cylindrica.* 33. *D. Afzelii.*
34. *D. ovata.* 35. *D. phrynioides.*
36. *D. bicolor.*

VII. Stirps *D. surculosæ.* Caules graciles cæspitosi. Folia distantia petiolata oblonga pseudo-opposita vel -ternata.

37. *D. surculosa.* 38. *D. camerooniana.*

1. D. Finlaysoni, *Baker, Trimen, Journ.* 1873, 261.—D. graminifolia, *Wall. Cat.* 5149, *non Linn.* Truncus arboreus, ramis floriferis junioribus 3 lin. crassis. Folia ascendentia sessilia modice conferta ensiformia 15–18 poll. longa medio 6–8 lin. lata ad apicem longe attenuata supra basin vix angustata eis *angustifoliæ* rigidiora saturate viridia marginibus concoloribus venis tenuibus immersis costa per dimidium inferius faciei inferioris solum perspicua. Panicula terminalis pedalis et ultra ramis paucis simplicibus arcuato-ascendentibus racemosis. Racemi laxiflori maximi 6–9 poll. longi expansi 15–18 lin. lati. Pedicelli 1–1½ lin. longi, apice articulati, infimi 3–4ni. Bracteæ minutæ deltoideæ. Perianthium albidum 8–9 lin. longum, segmentis tubo vix 1 lin. crasso æquilongis. Antheræ minutæ oblongæ. Stigma demum exsertum. *Malacca ad Pulo Dinding,* Finlayson in Wall. herb.! *Borneo,* Barber, 248!

2. D. marginata, *Lam. Encyc.* ii. 324; *Schult. fil. Syst.* vii. 340; *Kunth, Enum.* v. 7; *Regel, Revis.* 38.—D. tessellata, *Willd. Enum. Berol.* 374. Truncum vidi 4–5-pedalem ramosum 1 poll. crassum. Folia ensiformia dense rosulata 12–15 poll. longa medio 8–9 lin. lata, patula rigida plana vel facie canaliculata interdum longitudinaliter plicata viridia manifeste rubro marginata venis immersis costa ad faciem inferiorem præter apicem perspicua. Flores ignoti. *Madagascar,* Petit Thouars (*v. v. in hort. Kew. et Cant.*).

3. D. Kirkii, *Baker in Trimen, Journ.* 1874, 164. Truncus arboreus, ramis junioribus floriferis 3 lin. crassis. Folia densa ascendentia ensiformia 15–18 poll. longa medio 9–12 lin. lata, e medio ad apicem et basin angustata, supra basin 3–4 lin. lata, arundinaceo-coriacea, dimidio inferiore distincte costata, venis tenuibus immersis, marginibus concoloribus. Panicula pedalis et ultra ramis sublaxe racemosis ascendentibus arcuatis 6–9 poll. longis expansis 2 poll. latis. Pedicelli 1 lin. longi, inferiores fasciculati. Bracteæ minutæ deltoideæ. Perianthium 9 lin. longum albidum, segmentis tubum 1 lin. crassum duplo superantibus. Antheræ filamentis filiformibus 4–5plo breviores. Stigma demum exsertum. *Insula Johanna ad lacum Zilanga, alt.* 2500 *pedes,* Dr. Kirk!

4. D. aurea, *H. Mann. Mem. Bost. Soc. Nat. Hist.* i. 536 (*nomen*). Truncus arboreus 30-pedalis in exemplis visis 1 poll. crassus. Folia dense conferta ensiformia 1–2-pedalia medio 9–12 lin. lata rigide coriacea æqualiter multinervata ad apicem sensim attenuata supra basin deltoideam haud angustata margine concoloria, costa nulla. Panicula terminalis rachi crassa flexuosa ramis brevibus divaricatis. Pedicelli ascendentes solitarii vel gemini 3 lin. longi apice articulati. Bracteæ minutæ lanceolatæ membranaceæ. Perianthium rubro tinctum, 3 lin. crassum, 15–18 lin. longum, segmentis ligulatis tubo triplo

brevioribus. Antheræ 2–2½ lin. longæ, filamento applanato duplo breviores. Stigma exsertum. Bacca si trisperma 8–9 lin. crassa. *Insulæ Sandvicenses,* Mann et Brigham, 362! Hillebrand, 475!

5. D. Mannii, *Baker in Trimen, Journ.* 1874, 164. Truncus arboreus 30-pedalis. Rami juniores floriferi 2–3 lin. crassi. Folia ascendentia modice conferta ensiformia rigida sordide viridia concoloria 12–18 poll. longa, medio 9–12 lin., supra basin 4–6 lin. lata, ad apicem longe attenuata, subtiliter multinervata, costa ad dimidium inferius faciei inferioris perspicua. Panicula terminalis breviter pedunculata deltoidea ramis patentibus simplicibus racemosis. Racemi 3–6-poll. longi, expansi 1½ poll. lati. Pedicelli inferiores 3–6ni 1–2 lin. longi apice articulati. Bracteæ minutissimæ evanescentes. Perianthium viridulum 6 lin. longum, segmentis tubum vix 1 lin. crassum duplo superantibus. Antheræ 1 lin. longæ filamentis filiformibus quadruplo breviores. Stigma demum exsertum. *Guinea borealis ad ripas fluminis Old Calabar,* G. Mann, 2329! Rev. W. C. Thomson!

6. D. angustifolia, *Roxb. Fl. Ind.* ii. 155; *Wall. Cat.* 5141; *Kunth, Enum.* v. 4; *Regel, Revis.* 36; *Baker in Trimen, Journ.* 1873, 262. —D. ensifolia, *Wall. Cat.* 5143; *Kunth, Enum.* v. 5, *non Linn. nec Regel, Revis.* 39.—Terminalia angustifolia, *Rumph. Amboin.* iv. t. 35. —Terminalis angustifolia, *Medic. Theod.* 83.—Sanseviera fruticosa, *Blume, Enum. Jav.* i. 11; *Schult. fil. Syst.* vii. 361, 1679.—Cordyline Rumphii, *Hook. Bot. Mag.* t. 4279 (*quoad plantam Rumphii sed non tab.*); *F. Muell. Frag. Austr.* v. 194. Rami juniores floriferi 3–6 lin. crassi. Folia dense rosulata sessilia ascendentia ensiformia 12–18 poll. longa medio 1–1½ poll. lata, ad apicem sensim attenuata, supra basin 4–6 lin. lata præter apicem distincte costata saturate viridia modice firma venis crebris immersis marginibus concoloribus. Panicula breviter pedunculata terminalis deltoidea ½–1-pedalis ramis divaricatis flexuosis vel strictis simplicibus vel raro furcatis, racemis laxifloris sæpe semipedalibus, expansis 1½–2 poll. latis. Pedicelli 1–4ni, 3–4 lin. longi supra medium articulati. Bracteæ deltoideæ albidæ 1–2 lin. longæ. Perianthium album viridi tinctum 8–9 lin. longum segmentis tubo ¾–1 lin. crasso longioribus. Antheræ flavæ 1 lin. longæ filamento filiformi 4–5plo breviores. Stigma demum exsertum. Bacca flava vel rubra pulposa 1–3-loba 6–9 lin. crassa. *Himalaya orientalis a basi montium ad* 6000 *pedes* (*Khasia, Silhet, Assam*). Roxburgh! Wallich, 5143! Griffith, 5871! Hook. fil. et Thomson! &c. *Birma,* Wallich, 5141 C! M'Clelland! *Java,* Spanoghe! W. Lobb! *Borneo,* Beccari! *Australia tropicalis,* Damel! Schultz, 857! *Insulæ Fitzroy et Barnard,* MacGillivray! Forma diminuta ex Australia boreali (*Port Essington,* Armstrong!) habemus, foliis patulis semipedalibus ½ poll. latis floribus minoribus in paniculam

parvam ramis 1–4 brevibus ascendentibus dispositis. D. ENSIFOLIA, var. Greigii, *Regel, Gartenf.* t. 677, est forma foliis albo variegatis. SANSEVIERA FLEXUOSA, *Blume, Enum.* i. 11; *Kunth, Enum.* v. 21, ex descriptione non potui segregare.

7. D. DRACO, *Linn. Syst.* 275; *Lam. Encyc.* ii. 323; *Thunb. & Dallm. Diss.* 3; *Hayne, Arzneg.* ii. t. 2; *Schult. Syst.* vii. 237; *Kunth, Enum.* v. 3; *Webb & Berth. Phyt. Can.* iii. 30; *Bot. Mag.* t. 4571; *Flore des Serres,* t. 613; *Lemaire, Jard. Fleur.* t. 124; *Gaud. Atl. Bonite,* t. 1.—Asparagus? Draco, *Linn. Sp.* 451. Truncus arboreus altitudine (arbor notabilis Orotavæ) 60 ped. et crassitie 15 ped. attingens, apice copiose ramosus. Folia vidi (hort. Cant.!) 1500–2000 in coma densa 6–8-pedali, sessilia ensiformia omnia stricta vel exteriora recurvata $1\frac{1}{2}$–2-pedalia medio 15–21 lin. lata supra basin deltoideam vix angustata, ad apicem longe attenuata firma glauco-viridia distincte multinervata ecostata margine concoloria. Panicula terminalis deltoidea 1–2-pedalis ramis et ramulis divaricatis, racemis 6–12 poll. longis. Pedicelli 3–6ni 3–4 lin. longi medio articulati. Bracteæ minutæ lanceolatæ. Perianthium viridulum 4 lin. longum, laciniis tubo campanulato 4plo longioribus. Antheræ oblongæ filamentis applanatis 3–4plo breviores. Bacca aurantiaca, si monosperma magnitudine cerasi. *Insulæ Canarienses.*—D. BOERHAAVII, *Tenore, Fl. Neap. Prod. App.* 4; *Goppert, Nova Acta,* xxv. t. 2, est forma in hortis communis, foliis elongatis omnibus recurvatis.—D. OMBET, *Kotschy & Peyritsch, Pl. Tinneanæ,* 47, *cum icone habitus,* e montibus Indiæ et verisimiliter Socotræ insulæ incola, ex datis notis non potui segregare.

8. D. HOOKERIANA, *K. Koch, Wochen.* 1861, 394, 1867, 235.—Cordyline Rumphii, *Hook. Bot. Mag.* t. 4279, *excl. syn.*—D. Rumphii, *Regel, Revis.* 41, *excl. syn.* Truncus 2–5-pedalis interdum furcatus $1\frac{1}{2}$–2 poll. crassus. Folia 50–100 dense rosulata ensiformia modice firma exteriora reflexa 2–$2\frac{1}{2}$-pedalia, medio $1\frac{1}{2}$–2 poll. lata, supra basin vix angustata, ad apicem longe attenuata, plene viridia, marginibus distincte albo-pellucidis, inferna facie concavis, costa ad faciem inferiorem præter apicem perspicua. Panicula terminalis pedalis et ultra, ramis paucis vel multis elongatis laxifloris inferioribus interdum ramosis. Racemi interdum 6–9 poll. longi expansi 2–$2\frac{1}{2}$ poll. lati. Pedicelli 3–4 lin. longi apice articulati inferiores 3–4ni. Bracteæ $1\frac{1}{2}$–3 lin. longæ albidæ. Perianthium extus viride 12–15 lin. longum, segmentis tubo 1–$1\frac{1}{2}$ lin. crasso æquilongis. Antheræ flavæ $1\frac{1}{2}$ lin. longæ, filamentis filiformibus 4–6plo breviores. Stylus demum exsertus. Bacca aurantiaca 6–9 lin. crassa. *Caput Bonæ Spei in ditione orientali,* Drege, 4494 *a*! Burchell, 3564! D. LATIFOLIA, *Regel, Revis.* 41, est varietas culta foliis medio 3–$3\frac{1}{2}$ poll. latis.

9. D. UMBRACULIFERA, *Jacq. Hort. Schœn.* i. 50, t. 95; *Willd. Sp.* ii.

156; *Schult. Syst.* vii. 341; *Kunth, Enum.* v. 8; *Regel, Revis.* 35; *Lodd. Bot. Cab.* t. 289. Truncus arboreus, simplex, 3–6-pedalis, 2–3 poll. crassus. Folia 100–200 dense rosulata sessilia ensiformia 2–3½-pedalia medio 1½–2 poll. lata modice firma exteriora recurvata nitide viridia ad apicem longe angustata supra basin vix attenuata, deorsum conspicue undulata, costa præter apicem utrinque conspicua. Panicula terminalis breviter pedunculata corymbosa, ramis paucis ascendentibus. Pedicelli infimi solitarii vel gemini 4–6 lin. longi. Bracteæ minutæ deltoideæ. Perianthium 2 poll. longum album rubro tinctum, segmentis tubo cylindrico 1½–2 lin. crasso 2–3plo brevioribus. Antheræ oblongæ, filamentis filiformibus 3–4plo breviores. Stigma demum exsertum. *Mauritius,* Bojer &c., et sæpe in hortis culta.

10. D. Saposchnikowi, *Regel, Gartenfl.* t. 705, *Revis.* 39. Truncus arboreus deinde ramosus. Folia dense rosulata sessilia ensiformia 1½–2½-pedalia, medio 1½–2½ poll. lata plana saturate viridia venis tenuibus immersis, margine concoloria, costa ad faciem inferiorem præter apicem perspicua. Panicula terminalis ampla deltoidea, ramis et ramulis divaricatis densifloris. Pedicelli 3–6ni 1½–2 lin. longi. Perianthium viridulum inodorum 4–5 lin. longum, segmentis tubo longioribus. Antheræ luteæ, filamentis præter apicem applanatis. *Patria ignota.*

11. D. arborea, *Link, Enum. Hort. Berol.* 341; *Kunth, Enum.* v. 9; *Regel, Revis.* 36.—Aletris arborea, *Willd. Enum.* 381.—D. Knerckiana, *K. Koch, Wochen.* iv. 395, x. 235. Truncus arboreus interdum 40-pedalis. Folia densa sessilia lorata firma, extrorsa recurvata, 1½–3 pedes longa medio 2–3 poll. supra basin 1 poll. lata, basi caulem amplectente 2 poll. lato ad apicem longe attenuata plene viridia margine concoloria venis subtilibus immersis, costa ad faciem inferiorem præter apicem perspicua exsculpta deorsum undulata. Panicula terminalis longe pedunculata 1½–2 pedes longa et lata, ramis divaricatis inferioribus copiose ramosis. Racemi subdensi 3–6 poll. longi, pedicellis 4–5 lin. longis inferioribus 3–4nis supra medium articulatis. Bracteæ minutæ deltoideæ. Perianthium albidum 7–9 lin. longum, segmentis tubo 1 lin. crasso duplo longioribus. Antheræ oblongæ 1 lin. longæ. Stigma vix exsertum. Bacca, si monosperma, magnitudine cerasi. *Guinea borealis ad ripas fluminis Nun,* Gustave Mann, 454! (*v. v. in hortis multis*).—D. excelsa, *Tenore, Ind. Sem. Neap.* 1839, *adn.* 11; *Kunth, Enum.* v. 9, ex descriptione, est verisimiliter forma latifolia hujus speciei.

12. D. Perottetii, *Baker, in Trimen, Journ.* 1874, 165. Truncus 12-pedalis arboreus, ramis junioribus floriferis 2–3 lin. crassis. Folia conferta ascendentia sessilia oblanceolata 6–12 poll. longa,

supra medium 9–12 lin., supra basin 2–3 lin. lata, acuta modice firma purpureo tincta, præter apicem distincte costata, venis tenuibus immersis, marginibus concoloribus. Panicula terminalis deltoidea interdum pedalis, ramis laxe racemosis divaricatis. Pedicelli 2 lin. longi apice articulati, inferiores fasciculati. Bracteæ deltoideæ minutæ. Perianthium album 1 poll. longum, segmentis tubum cylindricum duplo superantibus. Antheræ 1½ lin. longæ. Stigma demum exsertum. *Senegambia*, Perottet 785! *Nigritia ad Nupe*, Barter 1511!

Var. MINOR, *Baker*; folia suprema 4–5 poll. longa medio 4–4½ lin. lata e medio ad apicem et basin sensim angustata. Racemi simplices. *Senegambia ad ripas fluminis Rio Nunez*, Heudelot!

13. D. PORTERI, *Baker, in Trimen, Journ.* 1873, 262.—D. maculata, *Wall. Cat.* 5148 A, *non Roxburgh*. Truncus arboreus, ramis junioribus floriferis 2–3 lin. crassis. Folia modice conferta ascendentia sessilia oblanceolata 6–12 poll. longa, supra medium 12–18 lin., supra basin 3–4 lin. lata, acuminata, basibus totum ramum amplectentibus, viridia albo-maculata, marginibus concoloribus venis crebris immersis, costa præter basin faciei inferioris haud perspicua. Racemi terminales simplices 3–6 poll. longi breviter pedunculati. Pedicelli 2–5ni ascendentes 1 lin. longi medio articulati. Bracteæ minutæ albæ deltoideæ. Perianthium album viridi tinctum 8–9 lin. longum, segmentis tubo haud 1 lin. crasso æquilongis. Stigma demum exsertum. *Penang*, Porter in Wall. herb.! Ab *D. spicata* præsertim foliis recedit; an sit varietas hujus speciei?

14. D. TIMORENSIS, *Kunth in Act. Acad. Berol.* 1842, 26; *Enum.* v. 6.—D. reflexa, *Decaisne, Herb. Timor.* 35, *excl. syn.* Truncus arboreus ramis junioribus floriferis 2 lin. crassis. Folia ascendentia sublaxa sessilia oblanceolata 1–9 poll. longa, medio 12–15 lin., supra basin 3–4 lin. lata, cite acuta, purpureo tincta, modice firma, costa præter apicem perspicua, marginibus concoloribus, venis subtilibus immersis. Panicula terminalis breviter pedunculata deltoidea semipedalis ramis paucis laxe racemosis ascendentibus. Pedicelli ascendentes 2–3 lin. longi apice articulati, inferiores 2–3ni. Bracteæ minutæ deltoideæ. Perianthium albidum 9–10 lin. longum, segmentis tubo 1 lin. crasso æquilongis. Antheræ filamento filiformi 4–5plo breviores. *Insula Timor*, Decaisne! (vidi in herb. DC.).

15. D. FRAGRANS, *Gawl. Bot. Mag.* t. 1081; *Schult. Syst.* vii. 342; *Kunth, Enum.* v. 9; *Regel, Revis.* 37.—Aletris fragrans, *Linn. Sp.* 456; *Andr. Rep.* t. 306; *Red. Lil.* t. 117.—Sanseviera fragrans, *Jacq. Fragm.* v. t. 2. fig. 6, t. 33. fig. 1.—Pleomele fragrans, *Salisb. Gen.* 74. Truncus arboreus 20-pedalis et ultra deinde ramosus. Folia sublaxa, centralia ascendentia, exteriora patula sessilia oblanceolata 2–3-pedalia, medio 3–4 poll., supra basin 1–1½ poll. lata, flaccida,

nitide viridia, acuta, marginibus concoloribus, venis tenuibus immersis, costa ad faciem inferiorem præter apicem perspicua. Panicula terminalis deltoidea pedalis et ultra ramis divaricatis dimidio inferiore nudis, inferioribus sæpe ramosis, floribus 40–50 in glomerulos globosos $1\frac{1}{2}$–2 poll. latos aggregatis. Bracteæ minutæ congestæ albæ scariosæ deltoideæ. Pedicelli 1–$1\frac{1}{2}$ lin. longi medio articulati. Perianthium suaveolens flavidum copiose melliferum 6–8 lin. longum, segmentis tubo vix 1 lin. crasso æquilongis. Antheræ flavæ 1 lin. longæ filamento triplo breviores. Stigma demum exsertum. Bacca aurantiaco-rubra si monosperma magnitudine cerasi. *Guinea ad Sierra Leone &c.*, Afzelius! *Abyssinia*, Quartin-Dillon! *Africa tropicalis austro-orientalis ad Moramballa*, Dr. Kirk! *et montem Chiradzura*, Dr. Meller!

16. D. CONCINNA, *Kunth, Enum.* v. 8; *Regel, Gartenfl.* 1859, 329, 1864, tab. 441.—Cordyline Betschleriana, *Göppert, Nova Acta*, xxv. 55.—Dracæna Betschleriana, *K. Koch, Wochen.* 1867, 325. Truncus interdum 6–7-pedalis apice ramosus, 2–3 poll. crassus. Folia dense rosulata sessilia oblanceolato-ensiformia 2–3 ped. longa, medio $2\frac{1}{2}$–3 poll. lata arundinaceo-subcoriacea firma facie concava longitudinaliter plicata, venis crebris immersis distincte costata viridia distincte rubromarginata. Flores ignoti. *Mauritius, ad Coin de Mire*, Horne, 106, sub nomine *D. marginatæ*! (*v. v. in hort. Kew. &c.*).

17. D. CINCTA, *Baker*.—D. marginata et gracilis. *Hort. Bull.* Truncus gracilis brevis simplex. Folia laxa patula ensiformia 12–15 poll. longa medio 5–7 lin. lata plana longitudinaliter plicata perfecte viridia marginibus rubro-brunneis $\frac{1}{2}$ lin. latis herbaceo-arundinacea venis immersis distincte costata supra basin vix angustata. Flores ignoti. *Patria ignota* (*v. v. in hort. Bull.*).

18. D. STENOPHYLLA, *K. Koch, Wochen.* 1861, 395, 1867, 236; *Regel, Revis.* 40.—D. punctata, *Hort. Van Houtte.* Truncus gracillimus humilis, interdum ramosus, foliis sublaxis herbaceo-arundinaceis recurvato-patentibus sessilibus ensiformibus 9–15 poll. longis 6–7 lin. latis ad apicem attenuatis supra basin vix angustatis nitide viridibus flavido punctatis marginibus concoloribus venis immersis costa per dimidium inferius subtus perspicua. Flores ignoti. *Patria ignota*. An sit forma *D. deflexæ*? (*V. v. in hort. Kew. et Bull.*)

19. D. REFLEXA, *Lam. Encyc.* ii. 324; *Red. Lil.* t. 92; *Schult. Syst.* vii. 340; *Kunth, Enum.* v. 6; *Regel, Revis.* 40; *Wall. Cat.* 5142.—D. cernua, *Roxb. Flor. Ind.* ii. 158.—D. lancea, *Thunb. Herb.*!—D. Candelaria, *Hort.* Truncus fruticosus 12–15-pedalis, interdum ramosus, ramis junioribus floriferis 2 lin. crassis, conspicue tessellatis. Folia laxe disposita patentia oblanceolata 5–6 poll. longa, supra me-

dium 9–12 lin., supra basin 2–3 lin. lata, viridia, arundinaceo-coriacea, præter apicem distincte costata, venis tenuibus immersis, marginibus concoloribus. Panicula terminalis erecta breviter pedunculata 6–12 poll. longa et lata ramis divaricatis simplicibus laxe racemosis, racemis 4–6 poll. longis, expansis 1½ poll. latis. Pedicelli patentes 2–3 lin. longi solitarii vel gemini apice articulati. Bracteæ minutæ deltoideæ vel lanceolatæ. Perianthium albidum 6–9 lin. longum, segmentis tubo campanulato quadruplo longioribus. Antheræ flavæ 1 lin. longæ, filamentis filiformibus. Bacca aurantiaco-rubra, si monosperma magnitudine pisi. *Mauritius et sæpe in hortis et per zonam tropicam veteris et novi orbis culta.*

Var. CERNUA, *Baker.*—D. cernua, *Jacq. Hort. Schoen.* i. 50, t. 96; *Kunth, Enum.* v. 7. A typo solum recedit panicula deflexa et foliis rubro marginatis.

Var. BREVIFOLIA, *Baker.* Folia breviora firmiora oblanceolata 4 poll. longa supra medium 8–9 lin. lata vix costata marginibus pellucidis, paniculis minoribus ramis paucis. *Madagascaria,* Blackburn! (*v. v. in hort. Kew.*).

Var. ANGUSTIFOLIA, *Baker,* est forma magis arborea, racemis densioribus, foliis angustioribus confertioribus 8–9 poll. longis e medio 4–5 lin. crasso utrinque longe attenuatis distincte costatis. *Sierra Leone,* Borkstadt! *Bourbon,* Capt. Carmichael! Bory! *Africa austro-tropicalis orientalis ad Moramballa,* Dr. Kirk! (forma foliis purpureis). *St. Helena,* Burchell! (culta). *Hort. Kew. trunco* 16–18-*pedali*! *Madagascaria,* Dr. Lyall!

Var. LINEARIFOLIA, *Baker.*—Dracæna linearifolia, *Ayres in herb. Kew.* Rami floriferi 2 lin. crassi. Folia linearia 6–8 poll. longa medio 3–4 lin. lata distinctissime costata longe acuminata. Paniculæ decurvatæ parce ramosæ vel interdum simpliciter racemosæ. *Mauritius ad montem Pouce,* Dr. Ayres!; et formam affinem habemus *ad ripas fluminis Nun in Guinea boreali,* a Bartero lectam ("20-pedalis, arbor gracilis ramosissima").

Var. SALICIFOLIA, *Baker.*—D. salicifolia, *Regel, Revis.* 42.—Cordyline salicifolia, *Göpp. Nova Acta,* xvi. 53.—D. flexuosa, *Regel, Gartenfl.* 1859, 328. Ramuli floriferi 1 lin. crassi. Folia linearia 3–4-pollicaria medio 3–4 lin. lata ecostata. Panicula parva ramis paucis brevibus ascendentibus vel divaricatis. *Madagascaria,* Dr. Meller! Gerrard!

20. D. KOCHIANA, *Regel, Revis.* 38.—D. arborea, *K. Koch, Wochen.* 1867, 236, *non Link.* Truncus humilis gracilis simplex vel ramosus. Folia sessilia ensiformia patenti-recurvata arundinaceo-herbacea ad apicem attenuata supra basin leviter angustata 12–18 poll. longa medio 9–15 lin. lata ad faciem inferiorem obscure rubro-marginata, venis immersis, costa ad faciem inferiorem præter apicem perspicua.

Panicula, teste Regel, *loc. cit.*, terminalis, ramis simplicibus, bracteolis violaceis, pedicellis æquilongis, floribus confertis inferioribus ternis. *Patria ignota* (*v. v. in hort. Bull.*). Inter *D. reflexam* et *fruticosam* habitu medium tenens, foliis vix perspicue rubro-brunneo marginatis.

21. D. FRUTICOSA, *K. Koch, Wochen.* 1867, 236.—D. ensifolia, *Regel, Gartenfl.* 1864, 321, tab. 451; *Revis. 39, non Wallich nec Linn.*—D. excelsa, *Hort. non Tenore.*—D. quitensis et cochinchinensis, *Hort.* Truncus arboreus sæpe ramosus, foliis 80–100 et ultra subpatulis laxe dispositis. Folia sessilia anguste lanceolata 12–18 poll. longa, medio 12–16 lin., supra basin 6–9 lin. lata, arundinaceo-coriacea plene viridia acuta præter apicem distincte costata, venis tenuibus immersis marginibus concoloribus. Panicula terminalis ampla deltoidea ramis racemosis laxifloris divaricatis. Pedicelli 2–3 lin. longi, infimi 3–4ni. Bracteæ minutæ albæ deltoideæ. Perianthium album 9–12 lin. longum, segmentis tubum paulo superantibus. Antheræ 1 lin. longæ filamentum filiforme 4–5plo superantes. Stigma demum exsertum. *Patria ignota* (*v. v. in hort. Kew. &c.*).

22. D. SPICATA, *Roxb. Fl. Ind.* ii. 157; *Kunth, Enum.* v. 10; *Wall. Cat.* 5146; *Regel, Revis.* 44; *Baker in Trimen, Journ.* 1873, 263.—D. Wallichii, *Kunth, Enum.* v. 11.—D. terniflora, *Roxb. Fl. Ind.* ii. 159, *non Wall.*—D. Heyneana, *Wall. Cat.* 5154.—D. terminalis, *Wight, Icon.* t. 2054, *non Lam.* Suffrutex gracilis, ramis floriferis apice 2–3 lin. crassis. Folia ascendentia contigua oblanceolata 6–9 poll. longa, supra medium 1½–2 poll. lata, acuta, ad basin sensim angustata, arundinaceo-coriacea viridia concoloria dimidio inferiore subtus costata venis tenuibus crebris immersis parum obliquis. Petioli 1–2 poll. longi lati canaliculati basi totum ramum amplectentes. Racemus simplex 3–6-pollicaris sessilis vel breviter pedunculatus, expansus 1½–2 poll. latus. Pedicelli 2–3 lin. longi medio articulati, inferiores 2–3ni. Bracteæ minutæ lanceolatæ vel deltoideæ. Perianthium albo-viridulum 6–9 lin. longum segmentis tubo cylindrico ½ lin. crasso æquilongis. Antheræ 1 lin. longæ, filamentis filiformibus 4–5plo breviores. Bacca aurantiaco-rubra si monosperma 3–4 lin. crassa. *Himalaya orientalis*, 0–3000 *pedes*, Wallich! Hk. fil. & Thomson! Griffith 5378! &c. *Bombay*, Dalzell! Stocks! *Neilgherries*, Dr. Wight! Dr. G. Thomson! *Insulæ Andaman*, Kurz! *Ad ripas sini Malacci*, Griffith 5876! 5878! Maingay 1684! *Congo*, Prof. C. Smith!

Var. AURANTIACA, *Baker in Trimen, Journ.* 1873, 263.—D. aurantiaca, *Wall. Cat.* 5149.—D. Jackiana, *Wall. Cat.* 5145, *ex parte.*—D. terniflora, *Regel, Revis.* 46, *non Roxb.* Robustior, petiolis 3–4 poll. longis, foliis magis coriaceis magis oblongis medio sæpe 3 poll. latis, racemis in paniculam sæpe pedalem ramis divaricatis dispositis, baccis

majoribus si monospermis 6 lin., si 2–3-spermis 10–12 lin. crassis. *Assam*, Griffith 5880! *Ad ripas sini Malaccæ ad Penang, Sincapore, et Malacca*, Wallich! Walker! Griffith 5873! Dr. Maingay 1685! 1688! *Congo*, Prof. C. Smith!

23. D. Thwaitesii, *Regel, Revis.* 44; *Baker in Trimen, Journ.* 1873, 263.—D. elliptica, *Thunb. & Dallm. Diss.* 3, *quoad plantam zeylanicam*; *Thwaites, Enum.* 338. Suffrutex gracilis ramosus, ramis floriferis apice 2–3 lin. crassis. Folia ascendentia subcontigua oblongo-lanceolata 6–8 poll. longa, medio 18–21 lin. lata, ad apicem et basin angustata, arundinaceo-coriacea viridia concoloria subtus dimidio inferiore costata venis tenuibus immersis parum obliquis. Petioli canaliculati 1–2 poll. longi basi caulem totum amplectentes. Flores in racemum vel paniculam confertam 2–3 poll. longam breviter pedunculatam dispositi. Pedicelli 1–3ni 1½–2 lin. longi apice articulati. Bracteæ minutæ deltoideæ. Perianthium 4–5 lin. longum segmentis tubum paulo superantibus. Antheræ filamentis filiformibus paulo breviores. Bacca si monosperma 3 lin. crassa. *Zeylania*, Gardner! Col. Walker! Thwaites C. P. 2293!

24. D. atropurpurea, *Roxb. Fl. Ind.* ii. 160; *Kunth, Enum.* v. 12. Suffrutex ramosus gracilis 10–20-pedalis ramis floriferis apice 2–3 lin. crassis. Folia ascendentia subcontigua minora oblongo-lanceolata 4–6 poll. longa medio 12–21 lin. lata, e medio utrinque attenuata, majora oblanceolata 9–12 poll. longa supra medium 2–3 poll. lata acuta, e medio ad basin sensim angustata, arundinaceo-coriacea, viridia vel atro-purpurea, præter apicem subtus distincte costata, venis tenuibus immersis parum obliquis. Petioli 6–12 lin. longi canaliculati. Panicula terminalis deltoidea 6–9-pollicaris breviter pedunculata ramis laxifloris divaricatis. Pedicelli 1–3ni, 2–3 lin. longi medio articulati. Perianthium album 8–9 lin. longum, segmentis tubum cylindricum ½ lin. crassum paulo superantibus. Antheræ 1 lin. longæ, filamentis filiformibus 5–6plo breviores. *Silhet, Khasia, et Chittagong*, 0-3000 *pedes*, Roxburgh, Hook. fil. & Thomson! *Tavoy*, Parish 161!

Var. Griffithii, *Baker*.—D. Griffithii, *Regel, Revis.* 47.—D. terniflora, *Wall. Cat.* 5147 B, *non Roxb.* Folia viridia oblanceolata minora 4–6 poll. longa medio 12–15 lin. lata. Ramuli gracillimi. Panicula 4–6-pollicaris ramulis multis divaricatis gracillimis curvatis. *Khasia*, Griffith 5869! *Amherst et Chappedong*, Wallich! *Mergui* Griffith 5877! *Malacca*, Maingay 1686! *Borneo*, Motley 202!

Var. Kurzii, *Baker*. Suffrutex 3–4-pedalis, ramis 2 lin. crassis, foliis lanceolatis viridibus, maximis 6–8 poll. longis, 9–12 lin. latis e medio utrinque longe angustatis. Panicula semipedalis, ramis multis rectis. *Insula meridionalis Andaman*, Kurz!

Var. GRACILIS, *Baker*.—D. gracilis, *Wall. Cat.* 5150. Rami gracillimi apice $1\frac{1}{2}$ lin. crassi. Folia viridia oblanceolata 3–4-pollicaria, medio 6–9 lin. lata, ad basin sensim angustata. *Penang*, Porter!

25. D. HUMILIS, *Baker in Trimen, Journ.* 1874, 166. Truncus brevissimus simplex apice florifero 2–3 lin. crasso. Folia contigua ascendentia lanceolata 6–12 poll. longa infra medium 2–$2\frac{1}{2}$ lin. lata acuminata basi deltoidea arundinaceo-coriacea concoloria dimidio inferiora ad faciem inferiorem costata venis tenuibus immersis subrectis. Petioli suberecti 9–12-pollicares medio graciles firmi $\frac{1}{2}$ lin. lati basi valde dilatati striati caulem totum amplectentes. Racemus simplex terminalis breviter pedunculatus 3–4-pollicaris expansus 1 poll. latus. Flores subsessiles ascendentes fasciculati, bracteis minutis membranaceis deltoideis evanescentibus. Perianthium 6 lin. longum segmentis tubo æquilongis. Antheræ filamentis filiformibus 4–5plo breviores. Bacca, si monosperma, 3 lin. crassa siccitate nigra. *Africa tropicalis occidentalis ad ripas fluminis Bagroo*, Mann 898!

26. D. THALIOIDES, *Morren, Belg. Hort.* 1860, 338, *cum icone*; *Regel, Revis.* 47.—D. Aubryana, *A. Brong. in Flore des Serres*, t. 1522–3; *K. Koch, Wochen.* 1867, 239. Truncus humilis simplex apice florifero 2–3 lin. crasso. Folia ascendentia contigua lanceolata arundinaceo-coriacea 6–12 poll. longa 1–3 poll. lata acuminata, basi in petiolum 3–15 poll. longum deorsum late dilatatum caulem amplectentem deltoideo-attenuata, præter apicem distincte costata concoloria venis tenuibus immersis. Racemi terminales longe pedunculati $\frac{1}{2}$–1-pedales simplices vel deorsum parce ramosi ramis brevibus ascendentibus. Flores subsessiles ascendentes 1–3ni. Bracteæ minutæ evanescentes. Perianthium albidum 10–12 lin. longum, segmentis tubo gracillimo quadruplo brevioribus. Antheræ filamentis filiformibus æquilongæ. Stigma demum exsertum, stylo filiformi. *Africa tropicalis occidentalis ad ripas fluminis Gaboon*, Mann 1036! 1038!

27. D. ELLIPTICA, *Thunb. et Dallm. Diss.* 3; *Kunth, Enum.* v. 14; *Hook. Bot. Mag.* t. 4787, *excl. syn.*; *Baker in Trimen, Journ.* 1873, 264.—D. javanica, *Kunth, Enum.* v. 12; *Regel, Revis.* 45.—Sanseviera javanica, *Blume, Enum.* i. 11.—Cordyline Sieboldii, *Planch. Fl. des Serres*, v. 132; *Miquel, Flor. Ind.-Bat.* iii. 557.—D. terniflora, *Wall. Cat.* 5147 A; *Kunth, Enum.* v. 11, *non Roxb.* Suffrutex gracilis ramosus, ramis floriferis junioribus apice 2–3 lin. crassis. Folia ascendentia modice conferta oblonga vel oblongo-lanceolata, 3–6 poll. longa, medio $1\frac{1}{2}$–2 poll. lata, acuta, basi subdeltoidea arundinaceo-coriacea viridia subtus dimidio inferiore costata venis tenuibus immersis parum curvatis. Petioli canaliculati 3–6 lin. longi. Paniculæ terminales deltoideæ brevissime pedunculatæ ramis divaricatis laxifloris. Pedicelli 2–3 lin. longi medio articulati 1–3ni. Bracteæ minutæ deltoideæ. Perianthium albidum 6–12 lin. longum segmentis

tubum ½ lin. crassum paulo superantibus. Antheræ 1 lin. longæ filamentis filiformibus 5–6plo breviores. Bacca, si monosperma, 3 lin. crassa. *Silhet*, Wallich! *Insulæ Andaman*, Kurz! *Java*, Spanoghe! Lobb! *Sumatra*, Roxburgh! *Borneo*, Beccari 551!

Var. MACULATA, *Hook.* (*Bot. Mag.* t. 4787).—D. maculata, *Roxb. Fl. Ind.* ii. 157; *Kunth, Enum.* v. 13.—Cordyline maculata, *Planch. Fl. des Serres*, t. 569). A typo solum differt foliis albo-maculatis.

28. D. DENSIFLORA, *Baker in Trimen, Journ.* 1874, 165. Truncus simplex apice florifero 3 lin. crasso. Folia ascendentia modice conferta oblonga 4–6 poll. longa, medio 2–3 poll. lata, arundinaceo-coriacea, concoloria, distincte costata, venis tenuibus immersis obliquis, apice deltoidea, basi spathulato-angustata. Petioli 3–6 poll. longi superne plani, basi caulem totum amplectentes. Racemus terminalis brevis breviter pedunculatus, floribus multis in glomerulos sessiles alternos aggregatis. Pedicelli 1½–2 lin. longi. Bracteæ minutæ evanescentes. Perianthium 12–15 lin. longum, segmentis tubo gracillimo brevioribus. *Fernando Po et ad ripas fluminis Gaboon*, Mann 1037!

29. D. FONTANESIANA, *Schult. fil. Syst.* vii. 1676; *Kunth, Enum.* v. 10; *Regel, Gartenf.* 1859, 329.—Cordyline Fontanesiana, *Göppert, Nova Acta*, 25, t. 3.—D. nigra, *Hort.Berol.Regel, Revis.* 43.—D. elliptica, *Desf. Cat. Hort. Par.* 388, *non Thunb.* Truncus arboreus brevis simplex vel ramosus. Folia ascendentia contigua oblonga 4–8 poll. longa, medio 2–3 poll. lata, apice et basi deltoidea, interdum oblanceolato-oblonga, modice firma, concoloria viridia vel albo-maculata, costa præter apicem ad faciem inferiorem perspicua, venis tenuibus immersis curvatis. Petioli 1–2 poll. longi lati canaliculati, totum caulem amplectentes. Racemus terminalis breviter pedunculatus simplex vel paniculatus deltoideus semipedalis vel pedalis, racemis expansis 1½ poll. crassis. Pedicelli 2–3 lin. longi medio articulati inferiores 3–4ni. Bracteæ minutæ deltoideæ vel lanceolatæ. Perianthium albidum 9–10 lin. longum segmentis tubo æquilongis. Antheræ filamentis filiformibus 4–5plo breviores. Stigma exsertum. Bacca si monosperma 3 lin. crassa. *Madagascaria*, Goudot! *et v. v. in hort. Kew. &c.*

30. D. GOLDIEANA, *Hort. Bull., Florist,* 1873, 187. Truncus simplex gracilis. Folia sublaxa patentia oblonga 7–8 poll. longa medio 4–5 poll. lata cuspidata carnoso-arundinacea basi late rotundata nitide viridia copiose conspicue albo fasciato-maculata venis immersis marginibus concoloribus costa ad faciem inferiorem præter apicem perspicua, juniora dorso rubro tincta, petiolo erecto-patenti 2–3 poll. longo profunde canaliculato prædita. Flores ignoti. *Africa tropicalis occidentalis* (*v. v. in hort. Bull.*). Habitus omnino *D. Fontanesianæ.*

31. D. GLOMERATA, *Baker in Trimen, Journ.* 1874, 166. Truncus simplex 8-pedalis apice florifero 3 lin. crasso. Folia modice conferta ascendentia oblonga, maxima 6–9 poll. longa, medio 3–4 poll. lata, basi deltoidea, petiolis 4–5 poll. longis, suprema breviora, 3–6 poll. longa, medio 2–3 poll. lata, basi magis rotundata, petiolis latis 1–2 poll. longis caulem totum amplectentibus, arundinaceo-coriacea concoloria, venis tenuibus curvatis, præter apicem ad faciem inferiorem distincte costata. Panicula terminalis breviter pedunculata deltoidea ramis brevibus arcuatis. Flores ad apices et nodos laterales ramorum more *D. fragrantis* 30–40 vel plures in glomerulos globosos $1\frac{1}{2}$ poll. latos congesti. Pedicelli $1–1\frac{1}{2}$ lin. longi. Bracteæ minutæ evanescentes. Perianthium 6 lin. longum segmentis tubo gracillimo ad basin incrassato triplo brevioribus. Antheræ flavæ, filamentis filiformibus triplo breviores. *Africa tropicalis occidentalis ad insulam Kobi*, 1° N. lat., Mann 1630!

32. D. CYLINDRICA, *Hook. fil. Bot. Mag.* t. 5846. Truncus simplex 10–12-pedalis apice florifero 3 lin. crasso. Folia contigua subpatentia oblanceolata 6–9 poll. longa supra medium $1\frac{1}{2}–2$ poll. lata arundinaceo-coriacea acuta distincte costata viridia concoloria venis tenuibus immersis, basi in petiolum latum 1–3 poll. longum caulem totum amplectentem sensim attenuata. Flores in spicam globosam 2–3 poll. longam et latam densissime congesti. Bracteæ magnæ deltoideæ coriaceæ persistentes floribus expansis paulo breviores. Perianthium 9–12 lin. longum, segmentis tubo gracillimo duplo brevioribus. Antheræ 1 lin. longæ filamentis duplo breviores. *Africa tropicalis occidentalis ad ripas fluminis Old Calabar*, Mann 2328! Rev. W. C. Thomson!

33. D. AFZELII, *Baker in Trimen, Journ.* 1874, 167. Frutex copiose ramosus. Folia arundinaceo-coriacea breviter petiolata lanceolata 5–6 poll. longa medio $1\frac{1}{4}$ poll. lata e medio utrinque angustata viridia concoloria subtus præter apicem costata. Petioli 3–6 lin. longi. Flores in spicam subsessilem terminalem conferti. Pedicelli brevissimi apice articulati. Bracteæ deltoideæ vel lanceolatæ 2–3 lin. longæ. Perianthium 6–7 lin. longum, segmentis tubo gracillimo brevioribus. *Sierra Leone*, Afzelius! (*in herb. Banks.*).

34. D. OVATA, *Gawl. Bot. Mag.* t. 1180; *Schult. fil. Syst.* vii. 345; *Kunth, Enum.* v. 13.—Aletris pumila, *G. Donn, Hort. Cant.* edit. 4. Truncus brevis ramosus. Folia rosulata oblonga 3–4 poll. longa medio 2 poll. lata apice et basi deltoidea obscure costata intense viridia concoloria venis primariis distinctis paucis curvatis venulis intermediis tenuibus immersis. Petioli ascendentes 1–2-pollicares. Flores in spicam subsessilem terminalem congesti. Bracteæ magnæ deltoideæ floribus expansis vix breviores. Pedicelli brevissimi fasciculati. Perianthium 8–9 lin. longum album rubro tinctum, segmentis

tubo æquilongis. Stamina inclusa, antheris filamentis medio incrassatis quadruplo brevioribus. *Sierra Leone*, Afzelius.

35. D. PHRYNIOIDES, *Hook. Bot. Mag.* t. 5352; *Regel, Revis.* 48. Suffrutex trunco brevissimo simplici. Folia pauca rosulata contigua, petiolis firmis ascendentibus valde inæqualibus 1–12 poll. longis medio angulatis ½ lin. crassis basi valde dilatatis striatis caulem totum amplectentes lamina ovata vel oblonga 3–8 poll. longa 2–4 poll. lata cuspidata basi rotundata subrigide coriacea concoloria vel albo-maculata præter apicem distincte costata venis 3–4 utrinque costam distinctis curvatis multis intermediis tenuibus immersis. Flores in spicam globosam breviter pedunculatam 1½ poll. latam, pedunculo recto vel cernuo, congesti. Bracteæ magnæ deltoideæ cuspidatæ subcoriaceæ floribus expansis vix breviores. Perianthium album 9–10 lin. longum segmentis tubo ½ lin. crasso triplo brevioribus. Stamina segmentis distincte breviora, antheris minutis, filamentis filiformibus medio incrassatis. Bacca monosperma magnitudine cerasi. *Fernando Po*, Mann 417! *Sierra del Crystal*, 1° *N. lat.*, Mann 1625! (*v. v. in hort. Bull.*).

36. D. BICOLOR, *Hook. Bot. Mag.* t. 5248; *Regel, Revis.* 45. Truncus 5-pedalis simplex apice florifero 2–3 lin. crasso. Folia subcontigua superiora paulo ascendentia oblonga 4–6 poll. longa, medio 2–3 poll. lata, apice deltoideo cuspidata, basi in petiolum 1–3 poll. longum caulem totum amplectentem angustata, inferiora magna oblongo-oblanceolata subpatentia 12–15 poll. longa 4–5 poll. lata arundinaceo-coriacea concoloria costa præter apicem perspicua venis tenuibus parum obliquis. Flores in spicam densam globosam terminalem breviter pedunculatam 2 poll. crassam conferti. Bracteæ magnæ firmæ subcoriaceæ brunneæ floribus expansis paulo breviores. Perianthium subsessile 9–10 lin. longum album rubro-tinctum segmentis tubo æquilongis. Antheræ 1 lin. longæ, filamentis filiformibus 4–5plo breviores. *Fernando Po et Old Calabar*, G. Mann!

37. D. SURCULOSA, *Lindl. Bot. Reg.* t. 1169; *Schult. fil. Syst.* vii. 1677; *Kunth, Enum.* v. 14: *Hook. Bot. Mag.* t. 5662; *Regel, Revis.* 43. Caules lignosi cæspitosi virgati 6–10-pedales, ramis copiosis divaricatis vel ascendentibus. Folia distantia patula opposita vel ternata (internodiis 2–3 poll. longis) oblonga 3–6 poll. longa, medio 1½–2½ poll. lata, basi deltoidea, apice acuta vel cuspidata, arundinaceo-coriacea, viridia concoloria vel albo-maculata, præter apicem ad faciem inferiorem distincte costata, venis distinctis parum curvatis. Petioli canaliculati 1½–2 lin. longi. Umbella simplex terminalis, pedunculo gracili 3–4-pollicari, globosus, expansus 1½–2 poll. latus, floribus 20–30 vel ultra, vel pedunculus interdum sub umbellam terminalem fasciculis sessilibus florum paucorum præditus. Pedicelli graciles

stricti 4–6 lin. longi infra medium articulati. Perianthium album 6–9 lin. longum, segmentis tubo gracillimo basi dilatato brevioribus. Antheræ flavæ filamentis filiformibus 3–4plo breviores. Bacca rubra si monosperma 3 lin. crassa. *Sierra Leone,* Afzelius ! G. Don. *Old Calabar,* Mann 2327 ! *Nigritia ad Angiama,* Barter 2095 !

38. D. CAMEROONIANA, *Baker in Trimen, Journ.* 1874, 166. Suffrutex 15-pedalis habitu omnino *D. surculosæ,* ramulis lignosis divaricatis, floriferis 1 lin. crassis. Folia patula 2–4na pseudo-verticillata oblongo-oblanceolata 4–8 poll. longa medio 1½–2 poll. lata, acuta, basi in petiolum brevissimum sensim angustata arundinaceo-coriacea concoloria, ad faciem inferiorem præter apicem costata, venis tenuibus immersis parum curvatis. Racemi terminales 3–9 poll. longi, expansi 2 poll. lati, rachi flexuosa, fasciculis multis alternis sessilibus 4–12-floris instructi. Pedicelli 1½–2 lin. longi medio articulati. Bracteæ minutæ membranaceæ deltoideæ. Perianthium albo-viridulum 9–12 lin. longum, segmentis tubo paulo brevioribus. Antheræ 1 lin. longæ filamentis filiformibus quadruplo breviores. Stigma demum exsertum. *Montes Cameroon, ad* 3500 *pedes,* Mann 1204 !

Species exclusæ.

D. ENSATA, *Thunb.*=Dianella ensifolia.

D. GRAMINIFOLIA, *L.*=Liriope graminifolia, *Baker.*=Ophiopogon spicatus, *Gawl.*

D. HIRSUTA, *Thunb.*=Palisota thyrsiflora, *Beauv.*

D. HEMICHRYSA, *Thunb.*=Astelia, sp.

D. ENSIFOLIA, *Haworth, non Linn.*=Yucca ensifolia, *Baker in Saund. Ref. Bot.* t. 318.

D. EHRHENBERGII, LENNEANA, et CALIFORNICA, *Hort.,* sunt Yuccæ.

D. BOREALIS, *Ait.*=Clintonia.

2. CORDYLINE, *Comm.*

Commers. in Juss. Gen. 40 (1789); *R. Br. Prodr. Fl. Austral.* 280; *Endlich. Gen.* no. 1166; *Kunth, Enum.* v. 22; *Hook. fil. Gard. Chron.* 1860, 791; *Regel, Gartenf.* 1859, 330; *K. Koch, Wochen.* 1867, 194, *non Planch.*—Charlwoodia, *Sweet, Fl. Austral.* sub t. 18; *Planch. Fl. des Serres,* vi. 138.—Calodracon et Dracænopsis, *Planch. Fl. des Serres,* vi. 137.—Dracænæ sp., *Linn. Forst. &c.*—Taetsia*, *Medic. Theod.* 82 (1786).

* This is an earlier name than *Cordyline,* and I was therefore inclined to adopt it; but as the description is not satisfactory, I have followed the advice of Mr. Bentham and Professor Oliver in retaining the well-known name.

Perianthium corollinum albidum vel lilacinum segmentis 6 ligulatis flore expanso falcatis tubo longioribus vel raro brevioribus æquilongis vel interioribus longioribus. *Stamina* 6 ad faucem tubi uniseriata, filamentis filiformibus segmentis paulo brevioribus, antheris oblongis dorsifixis apice et basi emarginatis introrsum dehiscentibus. *Ovarium* sessile ovoideum triloculare, ovulis in loculo 6–15 crebris biseriatis; stylus rectus filiformis, apice stigmatoso capitato vel brevissime tricuspidato. *Bacca* trilocularis, pericarpio sæpe sicco, seminibus in loculo paucis vel interdum solitariis, albumine ceraceo, testa nigra nitida. *Arbores vel suffrutices basi stoloniferæ foliis laxe vel dense rosulatis ensiformibus sessilibus vel oblanceolatis vel oblongis petiolatis arundinaceo-coriaceis, floribus paniculatis, pedicellis articulatis secus rachin sigillatim dispositis basi bracteolis tribus regulariter involucratis. Regiones calidiores veteris orbis, et species unica Americana.*

§ Calodracon. Perianthii segmenta subæquilonga. Folia petiolata oblanceolata vel oblonga.

Folia oblanceolata .... 1. *C. terminalis*. 2. *C. Banksii.*
Folia oblonga .... 3. *C. Haageana.*

§ Dracænopsis. Perianthii segmenta subæquilonga. Folia sessilia ensiformia.

Perianthii tubus brevis campanulatus........ 4. *C. pumilio.*
5. *C. australis.* 6. *C. obtecta.* 7. *C. indivisa.*
Perianthii tubus elongatus cylindricus ...... 8. *C. dracænoides.*

§ Charlwoodia. Perianthii segmenta interiora exterioribus distincte longiora.

Folia sessilia ensiformia .... 9. *C. stricta.*
Folia petiolata oblanceolata ....10. *C. rubra.*

§ Calodracon (*Planch.*). Perianthii segmenta subæquilonga. Folia petiolata oblanceolata vel oblonga.

1. C. terminalis, *Kunth, Enum.* v. 25; *Baker in Trimen, Journ.* 1873, 265.—C. cannæfolia, *F. Muell. Frag.* v. 196. Suffrutex gracilis caulibus 3–6 lin. crassis simplicibus vel ramosis. Folia contigua ascendentia lanceolata viridia vel varie colorata 12–18 poll. longa, 3–3½ poll. lata, acuta arundinaceo-coriacea distincte costata venis crebris inæqualibus valde obliquis. Petioli 4–6 poll. longi profunde canaliculati.

Panicula deltoidea pedalis et ultra breviter pedunculata ramis sublaxe racemosis expansis 8–10 lin. latis. Pedicelli brevissimi vel subnulli apice articulati. Bracteolæ deltoideæ membranaceæ ½–1 lin. longæ. Perianthium 5–6 lin. longum albidum vel lilacino vel rubro tinctum segmentis æqualibus tubum cylindricum paulo superantibus. Antheræ inclusæ filamentis duplo breviores. Stylus 3–4 lin. longus apice distincte tricuspidatus. Ovula in loculo 6–10. Bacca rubra globosa magnitudine cerasi. *Himalaya orientalis, China, Malacca, Insulæ Malaccanæ, Australia borealis, et ubique per tropicos culta.*

D. albo-rosea, Cooperi, Chelsoni, excelsa, gloriosa, metallica, Mooreana, porphyrophylla, siamensis, Shepherdi, spectabilis, et *utilis,* plantæ hortenses foliis varie coloratis vel variegatis verisimiliter ad *terminalem* veram pertinent.

Var. 1. FERREA.—Taetsia ferrea, *Medic. Theod.* 82.—Dracæna ferrea, *Linn. Syst. Veg.* 275; *Roxb. Flor. Ind.* ii. 156; *Bot. Mag.* t. 2053. —D. terminalis, *Jacq. Icones,* t. 448; *Red. Lil.* t. 91; *Lodd. Bot. Cab.* t. 1224.—Cordyline Jacquini, *Kunth, Enum.* v. 23. Est varietas sæpe culta foliis angustioribus magis oblanceolatis supra medium 2–2½ poll. latis sordide purpureis vel variegatis, petiolis brevioribus, racemis plantæ typicalis, sed floribus magis rubro tinctis sæpe minoribus.

D. albicans, angusta, bellula, concinna, Flemingii, Gibsoni, Guilfoylei, formosa, limbata, nigro-rubra, inscripta, nigrescens, Porteana, pulchella et *pulcherrima* sunt formæ hortenses foliis varie coloratis.

Var. 2. TI.—Cordyline Ti, *Schott, Bot. Zeit.* 1828, 571.—Dracæna brasiliensis, *Schult. fil. Syst.* vii. 1676.—Cordyline Eschscholziana, *Mart. in Schult. Syst.* vii. 347; *Kunth, Enum.* v. 27.—C. heliconiæfolia, *Otto et Dietr. Allgem. Gartenzeit.* 1835, no. 432; *Kunth, Enum.* v. 28.—Dracæna terminalis, *Lindl. Bot. Reg.* t. 1749. Robustior, foliis magis oblongis 4–6 poll. latis. Paniculæ majores ramis infimis compositis. Pedicelli brevissimi. Perianthium 6 lin. longum lilacino tinctum, segmentis tubo æquilongis. *Insulæ Polynesiæ.*

D. compacta, Dennisoni, esculenta, Fraseri, gloriosa, illustris, imperialis, magnifica, nobilis, regalis, robusta, Reginæ, Sieboldii, splendens, sulcata, &c. sunt formæ hortenses foliis variegatis vel splendide coloratis.

Var. 3. SIEBERI.—Cordyline Sieberi, *Kunth, Enum.* v. 23.—Folia oblanceolata pedalia vel sesquipedalia supra medium 2–3 poll. lata. Racemi expansi 1 poll. lati. Pedicelli patentes 1½–2 lin. longi, bracteolas superantes. Perianthium 4½–5 lin. longum, segmentis tubum cylindricum paulo superantibus. *Malacca,* Griffith, 5872! Maingay, 1689! *Borneo,* Motley, 1116! *Java,* Rottler! Introducta in *Mauritio,* Blackburn! et *insula Trinitatis,* Sieber, 70!

Var. 4. SEPIARIA.—Cordyline sepiaria, *Seem. Fl. Vit.* 311, t. 94. Folia oblanceolata supra medium 1½–3 poll. lata. Pedicelli brevissimi. Bracteæ minutæ. Perianthium 3 lin. longum, segmentis tubum campa-

nulatum duplo superantibus. *Insulæ Viti "vere silvestris,"* Seemann, 634! *Nova Hibernia*, Barclay! *San Cristoval*, Milne, 475!

Var. 5. CANNÆFOLIA.—Cordyline cannæfolia, *R. Br. Prodr. Fl. Austral.* 280 (*ex parte*?). Folia oblanceolata 12–15 poll. longa, 2–2½ poll. lata. Pedicelli brevissimi. Perianthium 2 lin. longum segmentis tubum campanulatum duplo superantibus. *Australia tropicalis occidentalis*, R. Brown in herb. Mus. Brit.!

Var. 6. BORYI, *Baker*. Folia oblanceolato-oblonga 3 poll. lata. Perianthium 3 lin. longum, segmentis tubum superantibus. Pedicelli 1½–2 lin. longi. *Insula Bourbon*, Bory de St. Vincent in herb. DC.!

Var. 7. HEDYCHIOIDES, *Baker*.—Cordyline hedychioides, *F. Muell. Mag.* v. 196. Folia 2–3 poll. lata oblanceolato-oblonga. Pedicelli ½–1 lin. longi. Perianthium 4–5 lin. longum profunde divisum. Bacca "capsularis" 4–5 lin. crassa. *Australia tropicalis ad Cape York*, Daemel!

Var. 8. MANNERS-SUTTONIÆ, *Baker*.—Cordyline Manners-Suttoniæ, *F. Muell. Fragm.* v. 195. Folia sesquipedalia 1½ poll. lata. Pedicelli 4–6 lin. longi. Perianthium 5 lin. longum segmentis tubo subæquilongis. Bacca sicca 4–5 lin. crassa rubella. *Australia subtropicalis ad Rockhampton*, Dallachy, Bowmann; *et in Monte Ellioti*, Fitzalan.

2. C. BANKSII, *Hook. fil. Gard. Chron.* 1860, 792; *New-Zeal. Handb.* 282; *Regel, Gartenflora*, t. 344.—C. Beuckelaerii, *K. Koch, Wochen.* 1867, 197. Truncus gracilis 5–10-pedalis simplex vel furcatus. Folia contigua ascendentia oblanceolata 2–4 pedes longa, medio 2–3 poll. lata acuminata basi in petiolum canaliculatum pedalem vel semipedalem sensim attenuata arundinaceo-coriacea siccitate convoluta supra viridia subtus glaucescentia distincte costata venis multis crebris stramineis obliquis conspicuis valde inæqualibus. Panicula amplissima deltoidea sæpe 4–5-pedalis, racemis laxifloris expansis 8–9 lin. latis. Pedicelli brevissimi vel subnulli. Bracteæ ½–1 lin. longæ deltoideæ vel infima lanceolata. Perianthium album 4–4½ lin. longum tubo campanulato, segmentis flore expanso e medio falcatis. Antheræ filamentis 4–5plo breviores. Stylus 3 lin. longus apice stigmatoso distincte tricuspidatus. Bacca 2–3 lin. crassa nigrescens pericarpio sicco, seminibus in loculo 2–3. *Insulæ Novæ Zealandiæ*. D. ERYTHRORACHIS, *Hort.*, est forma costa foliorum rubra.

3. C. HAAGEANA, *K. Koch, Wochen.* 1867, 195.—Cordyline Murchisoniæ, *F. Muell. Frag.* v. 195. Suffrutex caulibus gracilibus 3–6 lin. crassis simplicious vel furcatis brevibus. Folia contigua ascendentia oblonga falcata 4–8 poll. longa medio 2–2½ poll. lata acuta basi deltoidea vel rotundata arundinaceo-coriacea obscure viridia concoloria distincte costata venis tenuibus immersis obliquis. Petioli 3–4 poll. longi profunde canaliculati. Panicula lateralis deltoidea pedalis et

ultra breviter pedunculata, ramis laxe racemosis, expansis 8–10 lin. latis. Pedicelli 1½–2 lin. longi. Perianthium 4–4½ lin. longum, lilacino tinctum, segmentis subæqualibus flore expanso patulis tubo 1 lin. crasso æquilongis. Antheræ flavæ filamentis duplo breviores. Stylus 3 lin. longus apice haud tricuspidatus. Ovula in loculo 6–8. Bacca 3–4 lin. crassa pericarpio sicco. *Australia tropicalis,* Nernst, Dallachy. Sæpe in hortis nostris culta.

§ DRACÆNOPSIS (*Planch.*). Perianthii segmenta subæquilonga. Folia sessilia ensiformia.

4. C. PUMILIO, *Hook. fil. Gard. Chron.* 1860, 792; *New-Zeal. Handb.* 282.—C. stricta, *Hook. fil. New-Zeal. Flora,* i. 257, t. 58, *non Endlich.* Subacaulis, foliis 30–60 dense rosulatis ascendentibus anguste ensiformibus 1½–2½ ped. longis medio 3–4 lin. latis arundinaceo-coriaceis distincte costatis siccitate paulo revolutis venis rectis utrinque costam 6–10 præditis. Panicula 1–5-pedalis distincte pedunculata ramis et ramulis laxifloris gracillimis. Perianthium albidum 1½–2 lin. longum subsessile vel brevissime pedicellatum, segmentis tubo campanulato 3–4plo longioribus, flore expanso infra medium falcatis. Bracteola infima lanceolata ½ lin. longa, superiores deltoideas duplo superans. Antheræ filamenta filiformia 2–3plo superantes. Stylus 1–1½ lin. longus, stigmate distincte tricuspidato. Bacca sicca 1½–2 lin. crassa seminibus in loculo sæpe solitariis. *Novæ Zealandiæ insula borealis.*

5. C. AUSTRALIS, *Hook. fil. Gard. Chron.* 1860, 792; *Bot. Mag.* 5636; *New Zeal. Handb.* 281, *non Bot. Mag.* t. 2835.—Dracæna australis, *Forst. Prodr.* No. 151.—Cordyline indivisa, *Regel, Gartenfl.* 1859, 331.—C. superbiens, *K. Koch, Wochen.* 1859, 380.—Dracænopsis calocoma, *Wendland, Bot. Zeit.* 1859, 277.—Cordyline calocoma, *Hort.* Truncus arboreus 20–30-pedalis sæpe furcatus. Folia 100 et ultra dense rosulata ensiformia sessilia 3–4-pedalia medio 12–18 lin., supra basin 6–9 lin. lata, acuminata utrinque viridia firma siccitate haud convoluta a basi ad apicem distincte costata venis utrinque costam 12–20 exsculptis vix obliquis. Panicula erecta terminalis breviter pedunculata bipedalis et ultra deltoidea ramis inferioribus divaricatis copiose paniculatis racemis laxis vel subdensis expansis 8–9 lin. latis. Pedicelli brevissimi patentes apice articulati. Bracteolæ deltoideæ subæquales ½ lin. longæ. Perianthium albidum 3–4 lin. longum, tubo campanulato, segmentis flore expanso e medio falcatis. Antheræ oblongæ filamentis filiformibus 3–4plo breviores. Stylus inclusus 1½–2 lin. longus apice stigmatoso brevissime tricuspidato. Bacca 2 lin. crassa seminibus in loculo sæpe solitariis. *Insulæ Novæ Zealandiæ.*

DRACÆNA LINEATA, *Hort. Angl.*, est varietas foliis latioribus magis arundinaceis venis minus exsculptis ab *C. obtectam* habitu accedens. CORDYLINE LENTIGINOSA, *Linden et André, Ill. Hort.* n. s. t. 35, est forma foliis duris rigidis brunneis; DRACÆNA VEITCHII, *Hort. Angl.*, est forma costa foliorum pulchre rubra.

6. C. OBTECTA, *Baker*.—Dracæna obtecta, *Graham, Edin. Phil. Journ.* 1827, 175.—Cordyline Baueri, *Hook. fil. Gard. Chron.* 1860, 792; *K. Koch, Wochen.* 1860, 355.—Dracæna australis, *Hook. Bot. Mag.* t. 2835, *non Forster*.—Cordyline australis, *Endl. Prod. Norfolk*, 29; *Bauer, Ill.* 176–7, 207; *Regel, Gartenf.* t. 450. Truncus arboreus 10–20-pedalis simplex vel furcatus. Folia 100 et ultra dense rosulata ascendentia sessilia ensiformia 2–4 pedes longa, medio 2–4 poll., supra basin 1–2 poll. lata, acuminata, utrinque viridia, eis *C. australis* magis arundinacea, siccitate convoluta venis utrinque costam 30–40 æqualibus valde obliquis, præter apicem distincte costata. Panicula ampla erecta deltoidea, ramis inferioribus copiose paniculatis. Racemi sublaxi, expansi 6–8 lin. lati. Pedicelli patentes brevissimi apice articulati. Bracteola infima lanceolata membranacea 3–4 lin. longa. Perianthium album 3–4 lin. longum, tubo breviter campanulato, segmentis flore expanso e medio falcatis. Antheræ filamentis 3–4plo breviores. Stylus 2 lin. longus apice stigmatoso tricuspidato. Ovula in loculo 6–10. *Insula Norfolk* (sed non Nova Zelandia nec Nova Hollandia ut auctores dicunt).

7. C. INDIVISA, *Kunth, Enum.* v. 30; *Hook. fil. Flor. New Zeal.* i. 258; *Gard. Chron.* 1860, 792; *New Zeal. Handb.* 281. Truncus simplex, raro furcatus arboreus 10–20-pedalis. Folia sessilia dense conferta lorata 2–4 pedes longa, medio 4–5 poll., supra basin 1½–2 poll. lata, rigide coriacea supra viridia subtus glauca venis utrinque costam 40–50 et ultra crassis valde obliquis. Panicula nutans 3–4-pedalis, ramis simplicibus dense racemosis cylindricis flore expanso 7–8 lin. crassis inferioribus pedalibus, rachi crassa profunde sulcata. Pedicelli ascendentes ½–1 lin. longi. Bracteola infima lanceolata membranacea 3–4 lin. longa; superiores minutæ. Perianthium 3–4 lin. longum album, tubo brevissimo campanulato, segmentis flore expanso e medio falcatis. Antheræ filamentis filiformibus 3–4plo breviores. Stylus 1½–2 lin. longus, apice stigmatoso integro. Ovula in loculo 5–6. *Nova Zealandia*, Colenso! Lyall! Cl. Kirk censet species 2 sub nostra confusæ: 1, planta Forsteri originalis; et 2, planta Hookeri floribus minoribus; et posteriorem dicat *Cordyline Hookeri*.

8. C. DRACÆNOIDES *Kunth, Act. Acad. Berol.* 1842, 30.—C. spectabilis, *Kunth et Bouché, Ind. Sem. Berol.* 1848; *Kunth, Enum.* v. 30.—C. Sellowiana, *Kunth, Act. Acad. Berol.* 1842, 30.—C. odorata, *K.*

Koch et Bouché, Berl. Allg. Gartenzeit. 1858, 243.—Charlwoodia fragrantissima, *Lemaire, Jard. Fleur.* t. 399. Truncus arboreus 10–20-pedalis. Folia sessilia ensiformia dense rosulata ascendentia 2–3-pedalia medio 1½–2 poll., supra basin 6–9 lin. lata acuminata coriaceo-arundinacea præter apicem distincte costata supra viridia subtus pallidiora subglauca venis multis crebris distinctis inæqualibus parum obliquis. Paniculæ erectæ distincte pedunculatæ deltoideæ 1–2-pedales, ramis multis ascendentibus inferioribus compositis racemosis densifloris expansis 6–9 lin. crassis. Pedicelli 1–1½ lin. longi apice articulati. Bracteolæ minutæ deltoideæ vel lanceolatæ. Perianthium 4 lin. longum suaveolens tubulosum lilacino tinctum, segmentis subæqualibus tubo cylindrico 3–4plo brevioribus flore expanso patulis. Filamenta antheris breviora. Stylus apice stigmatoso obscure lobatus. Ovula in loculo 10–15. *Brasilia in ditione St. Paulo,* Sello, Burchell 4871! Libon. *Guiana Gallica,* Martin 1156!

§ CHARLWOODIA (*Sweet*). Perianthii segmenta interiora exteriora distincte superantia. Folia sessilia vel petiolata.

9. C. STRICTA, *Endlich. Syn.* i. 162; *Kunth, Enum.* v. 33; *Hook. fil. Gard. Chron.* 1860, 792; *F. Muell. Frag.* v. 195.—Charlwoodia congesta, *Sweet, Flor. Austral.* t. 18.—Cordyline congesta, *Endl. Gen.* 151; *Kunth, Enum.* v. 32.—Cordyline angustifolia, *Kunth, Enum.* v. 32.—Cordyline rigidifolia, *K. Koch & Bouché, Berl. Allg. Gartenzeit.* 1858, 243. Truncus gracilis 6–12-pedalis simplex vel furcatus. Folia contigua sed minus conferta quam in *australi* et *obtecta,* sessilia ensiformia acuminata 1–2 pedes longa, medio 9–15 lin., supra basin 3–6 lin. lata, præter apicem graciliter costata, arundinaceo-coriacea utrinque viridia venis crebris immersis parum obliquis marginibus obscure denticulatis. Panicula terminalis vel lateralis erecta vel cernua distincte pedunculata deltoidea 1–2-pedalis ramis divaricatis inferioribus sæpe furcatis racemis laxis vel subdensis expansis 8–10 lin. latis. Pedicelli ½–1 lin. longi. Bracteolæ infimæ lanceolatæ supremas deltoideas superantes. Perianthium lilacinum 3–4 lin. longum, tubo campanulato, segmentis interioribus reliqua distincte superantibus. Antheræ ¾–1 lin. longæ filamentis filiformibus. Stylus 2–3 lin. longus apice stigmatoso obscure tricuspidato. Ovula in loculo 6–10. *Australia subtropicalis,* A. Cunningham! Fraser! Dr. Beckler! &c. C. CONGESTA, *Sweet,* est forma foliis latioribus densioribus; C. STRICTA, foliis angustioribus; C. RIGIDIFOLIA, *K. Koch,* foliis brevibus firmis parvis haud recurvatis.

10. C. RUBRA, *Hügel in Kunth, Enum.* v. 34; *Regel, Gartenf.* 1859, 330, tab. 447.—*K. Koch, Wochen.* 167, 196.—Dracæna zeelandica, *Hort.*—Charlwoodia rubra, *Planch. Fl. des Serres,* vi. 138. Suffrutex gracilis interdum 10–15-pedalis, caulibus 3–12 lin. crassis simplicibus

vel furcatis. Folia contigua ascendentia oblanceolata 12–15 poll. longa supra medium 18–21 lin. lata, arundinaceo-coriacea, eis *terminalis* firmiora, utrinque obscure viridia distincte costata venis tenuibus immersis obliquis. Petioli lati canaliculati 4–6-pollicares. Panicula lateralis cernua distincte pedunculata deltoidea pedalis et ultra, racemis laxifloris 3–6 poll. longis 10–12 lin. latis. Pedicelli brevissimi. Bracteolæ parvæ deltoideæ. Perianthium lilacinum 4½–5 lin. longum, segmentis tubum cylindricum paulo superantibus, interioribus distincte longioribus. Antheræ flavæ 1–1½ lin. longæ filamenta superantes. Ovula in loculo 6–8. Stylus 2–2½ lin. longus apice haud tricuspidato. Baccam non vidi. *Patria ignota, sæpe in hortis culta* Inter *terminalem* et *strictam* medium tenens, habitu prioris, floribus posterioris. C. VIOLASCENS, *Regel, Gartenf.* 1859, 331, est varietas foliis paulo majoribus primum leviter violaceo tinctis.

3. COHNIA, *Kunth.*

Kunth, Enum. v. 35.—Dracæna, sp., *Lam. &c.*

Perianthium 6-partitum corollinum segmentis lanceolatis obscure trinervatis subæqualibus flore expanso patulis. *Stamina* 6 inclusa perigyna, filamentis leviter applanatis, antheris oblongis versatilibus introrsum longitudinaliter dehiscentibus. *Ovarium* sessile ovoideum, ovulis in loculo 4–6 biseriatis; stylus brevis filiformis rectus vel obsoletus apice stigmatoso obscure tricuspidato. *Bacca* globosa, seminibus in loculo 2–4, testa nitida nigra, albumine ceraceo. *Suffrutices habitu* Cordylines § Calodraconis *pedicellis solitariis apice articulatis, basi bracteolis tribus involucratis.*

Stigma subsessilis .... 1. *C. floribunda.*
Stylus productus.
  Antheræ filamentis duplo breviores......... 2. *C. mauritiana.*
  Antheræ filamentis æquilongæ.............. 3. *C. neocaledonica.*

1. C. FLORIBUNDA, *Kunth, Enum.* v. 36.—Cohnia parviflora, *Kunth, Enum.* v. 37, *excl. syn.*—Dracæna mauritiana, *Bojer, Hort. Maur.* 348, *non Lam.*—D. sarmentosa, *Bojer. MSS.* Suffrutex gracilis sarmentosus ramis floriferis apice 3–6 lin. crassis. Folia conferta ascendentia petiolata lanceolata 1½–2 pedes longa medio 2–3 poll. lata, ad apicem et basin sensim attenuata, arundinaceo-coriacea, eis *Cordylines terminalis* crassiora, præter apicem distincte costata, concoloria viridia vel purpureo tincta venis crebris inæqualibus obliquis. Petioli late canaliculati 4–6-pollicares. Panicula ampla longe pedunculata deltoidea ramis inferioribus copiose paniculatis, racemis laxis, centralibus 3–4 poll. longis, expansis 5–6 lin. latis. Pedicelli solitarii patentes 1–1½

lin. longi, apice articulati, more *Cordylines* bracteolis tribus minutis involucrati. Perianthium album 1–1½ lin. longum. Stamina inclusa antheris oblongis filamento duplo brevioribus. Ovarium ovoideum stigmate peltato subsessili. Bacca globosa seminibus in loculo 4–6. *Mauritius in sylvis*, Bojer! Carmichael! Ayres! &c.

2. C. MAURITIANA, *Baker*.—Dracæna mauritiana, *Lam. Encyc.* ii. 325. —D. flabelliformis, *Bory, Iter*, i. 270!—D. acuminata, *Thunb. & Dallm. Diss.* 3! *Kunth, Enum.* v. 143.—Cohnia macrophylla, *Kunth, Enum.* v. 37. Suffrutex gracilis sarmentosus ramis floriferis 3–6 lin. crassis. Folia contigua ascendentia lanceolata 2–4-pedalia medio 2–4 poll. lata, ad apicem et basin attenuata, rigide subcoriacea præter apicem distincte costata venis crebris distinctis obliquis. Petioli lati canaliculati 4–6-pollicares. Paniculæ amplæ deltoideæ longe pedunculatæ, racemis ultimis sublaxis 3–4 poll. longis, expansis ½ poll. latis. Bracteolæ ½–1 lin. longæ. Pedicelli solitarii ½–1 lin. longi apice articulati. Perianthium 2–2½ lin. longum. Antheræ filamentis duplo breviores. Ovarium ampullæforme, apice in stylum ovario subæquilongum attenuatum. Stigma obscure trilobatum. Bacca globosa seminibus in loculo 3–4. *Insula Bourbon*, Bory de St. Vincent! Gaudichaud! Boivin! Ab *C. floribunda* præsertim recedit stylo producto.

3. C. NEOCALEDONICA, *Baker*. Suffrutex habitu omnino *Cordylines terminalis*. Folia lanceolata pedalia vel sesquipedalia medio 2–3 poll. lata ad apicem et basin attenuata concoloria arundinaceo-coriacea præter apicem distincta costata venis crebris æqualibus parum obliquis. Paniculæ amplæ deltoideæ pedunculatæ racemis ultimis laxis 4–6 poll. longis expansis 8–9 lin. latis. Bracteolæ minutæ deltoideæ. Pedicelli patentes 1½–2 lin. longi apice articulati. Perianthium 2 lin. longum, segmentis lanceolatis acutis. Stamina inclusa, antheris 1 lin. longis filamentis æquilongis. Ovarium 1 lin. longum, stylo 1 lin. longo apice subintegro. Baccam nondum vidi. *Insula Nova Caledonia*, Vieillard, 1388! Pancher!

Tribus II. SANSEVIEREÆ.

4. SANSEVIERA, *Thunb.*

Thunb. Nov. Gen. 121; *Prodr. Cap.* 65; *Willd. Sp. Plant.* ii. 159; *Schult. fil. Syst.* vii. 355; *Endlich. Gen.* no. 1113; *Kunth, Enum.* v. 16.—Acyntha (*Commel.*), *Medic. Theod.* 96.—Salmia, *Cav. Ic.* iii. t. 246. *non aliorum.*—Aletris, sp., *Linn.*

Perianthium albidum gamophyllum tubo cylindrico, segmentis 6 subæqualibus tubo æquilongis vel brevioribus flore expanso patulis. *Stamina* 6 ad faucem tubi uniseriata inclusa filamentis filiformibus basi applanatis antheris oblongis versati-

libus introrsum longitudinaliter dehiscentibus. *Ovarium* parvum sessile ampullaceum triloculare, ovulis in loculis solitariis ascendentibus; stylus gracillimus rectus exsertus; stigma capitatum. *Bacca* globosa carnosa, seminibus 1–3 magnis triquetris, albumine corneo, testa pallida membranacea. *Suffrutices acaules rosulis foliorum cartaliginosorum fibrosorum sæpe crassorum ex rhizomate ortis, scapis robustis subnudis, floribus copiose simpliciter racemosis fasciculatis, pedicellis articulatis. Ad* Dracænam *nisi habitu arcte accedit. Regiones calidiores veteris orbis sæpe in hortis cultæ.*

Folia oblanceolata cartilaginea medio ½ lin. crassa.

1. *S. guineensis.* 2. *S. thyrsiflora.*
3. *S. longiflora.* 4. *S. senegambica.*
5. *S. nilotica.*

Folia subteretia medio 3–6 lin. crassa ensiformia ad apicem longe attenuata:

6. *S. zeylanica.* 7. *S. Roxburghiana.*
8. *S. lanuginosa.* 9. *S. Ehrenbergii.*

Folia cylindrica basi solum prope scapum leviter excavata.

10. *S. cylindrica.*

1. S. GUINEENSIS, *Willd. Sp.* ii. 159; *Gawl. Bot. Mag.* t. 1179; *Red. Lil.* t. 330; *Kunth, Enum.* v. 16.—Aletris hyacinthoides, var. guineensis, *Linn. Sp.* 456.—Aletris guineensis, *Jacq. Vind.* i. 63, t. 84.—Acyntha guineensis, *Medicus, Theod.* 76.—S. latifolia, *Bojer, Hort. Maur.* 348. Rhizoma late repens. Folia ex nodo 3–6, suberecta oblanceolata cartilaginea 3–4-pedalia supra medium 2½–5 poll. lata albo maculato-fasciata superne plana apice concava cuspidata deorsum facie leviter concava margine albo-corneo vel obscure rubro. Scapus pedalis vel sesquipedalis glaucus purpureo-viridis bracteis 3–4 deltoideis membranaceis. Racemus simplex 1½–2-pedalis expansus 3 poll. latus. Pedicelli 3–6ni, 2–3 lin. longi, medio articulati. Perianthium 2 poll. longum albidum viridulo-brunneo tinctum, segmentis tubo æquilongis. Antheræ flavæ 1 lin. longæ. Stylus gracillimus demum 4–6 lin. exsertus. *Africa tropicalis, Guinea,* Barter! *In ditione fluminis Zambesi,* Dr. Kirk! (Ex exemplis vivis in hort. Kew. descripta.) S. LÆTEVIRENS, GLAUCA, et POLYPHYLLA, *Haworth, Kunth, Enum.* v. 17–20, sunt verisimiliter formæ hortenses hujus speciei.

2. S. THYRSIFLORA, *Thunb. Prodr.* 65! *Fl. Cap.* 329.—Salmia spicata, *Cav. Ic.* iii. 24, t. 246.—Sanseviera spicata, *Haworth, Syn. Succ.* 66; *Kunth, Enum.* v. 20.—S. fulvo-cincta, *Haworth, Syn. Succ.* 30, *teste planta in hort. Kew. culta.*—S. angustifolia, *Lindberg, Act. Soc. Fenn.*

x. 130, t. 5.—S. rufocincta, *hort. Angl.* Folia ex nodo sæpe 6–12 interdum oblanceolata planiuscula cartilaginea 9–18 poll. longa, supra medium 12–21 lin., supra basin 5–6 lin. lata, acuta obscure fasciata distincte rubro-marginata. Scapus pedalis et ultra, bracteis 5–6 scariosis lanceolatis. Racemus 9–12-pollicaris, nodis haud contiguis, expansus 2½–3 poll. latus. Pedicelli 2–6ni 1–2 lin. longi, supra medium articulati. Perianthium albidum 12–21 lin. longum, segmentis tubo 1–1½ lin. crasso subæquilongis. Antheræ 1½ lin. longæ. Stylus demum 3–4 lin. exsertus. *Caput Bonæ Spei* ("Kei" incolarum), Thunberg! Drège 8613! Zeyher 612! Mrs. Barber 439! Cooper 3269! Sæpe in hortis culta.

3. S. LONGIFLORA, *Sims, Bot. Mag.* t. 2634; *Schult. fil. Syst.* vii. 357, 1678; *Kunth, Enum.* v. 17. Folia ex nodo 4–6 suberecta oblanceolata 1–2-pedalia, medio 3–4, supra basin 1 poll. lata, cartilaginea haud crassa albo-maculata distincte rubro-marginata, deorsum leviter concava. Scapus pedalis et ultra 3–6 lin. crassus. Racemus densus, pedalis vel sesquipedalis, floribus expansis 8–9 poll. crassus. Pedicelli 2–3 lin. longi dense fasciculati medio articulati. Bracteæ scariosæ lanceolatæ 3–6 lin. longæ. Perianthium albo-viridulum 3½–4 poll. longum, sub anthesin cernuum, segmentis tubo ½–1 lin. crasso triplo brevioribus. Antheræ pallide luteæ 2 lin. longæ. Stylus 6–9 lin. exsertus. *Africa tropicalis occidentalis. Fernando Po,* Mann 1169! Barter 2060! *Congo,* C. Smith! *Angola in ditione Ambriz,* Monteiro!

4. S. SENEGAMBICA, *Baker.* Folia oblanceolata planiuscula cartilaginea subpedalia, supra medium 12–15 lin., supra basin 6–8 lin. lata, acuta, e medio ad basin attenuata, margine concoloria. Racemus laxus pedalis vel sesquipedalis expansus 1½–2 poll. crassus. Pedicelli 3–6ni gracillimi, 2–3 lin. longi supra medium articulati. Perianthium 9–12 lin. longum, segmentis tubo gracillimo subæquilongis. Antheræ 1 lin. longæ. Stylus leviter exsertus. *Senegambia ad ripas fluminis Senegal,* Perottet 76! 782! in herb. DC.; Richard in hb. Gay!

5. S. NILOTICA, *Baker.* Folia ensiformia cartilaginea planiuscula 3–4-pedalia, e medio 12–15 lin. lato, ½ lin. crasso, utrinque sensim angustata, supra basin 1½ lin. crassam longe canaliculata, margine nullo modo rubella. Racemus laxissimus 15–18-pollicaris. Pedicelli fasciculati, ex nodis superioribus 2–3, inferioribus 6–9, ascendentes 3–4 lin. longi supra medium articulati. Bracteæ lanceolatæ scariosæ infimæ pedicellos superantes, superiores breviores. Perianthium albo-viridulum 10–12 lin. longum, segmentis tubum cylindricum paulo superantibus. Stylus 1½–2 lin. exsertus. *Ad ripas Nili Albi in ditione Muro,* Petherick!

6. S. ZEYLANICA, *Willd. Sp.* ii. 159; *Red. Lil.* t. 290; *Gawl. Bot.*

Reg. t. 160; *Schult. Syst.* vii. 357; *Kunth, Enum.* v. 18.—Aletris hyacinthoides, var. zeylanica, *L. Sp.* i. 456; *Mant.* 367.—Aloe zeylanica, *Jacq. Vind.* 310.—Aletris zeylanica, *Mill. Dict.* no. 4.—S. æthiopica, *Thunb. Prodr.* 65!; *Flor. Cap.* 329; *Kunth, Enum.* v. 19. Folia ex nodo 8–15 falcata, 1–2-pedalia et ultra ensiformia subteretia basi 9–12 lin. lata, profunde canaliculata dorso rotundata verticaliter lineata medio 4–6 lin. crassa, obscure viridia, albo maculato-fasciata, ad apicem sensim attenuata, rigide coriacea, marginibus scariosis et distincte rubro-lineatis. Scapus pedalis et ultra foliis pluribus scariosis parvis lanceolatis. Racemus pedalis et ultra subdensus, 2–2½ poll. latus. Pedicelli 3–6ni, 1–2 lin. longi, supra medium articulati. Bracteæ lanceolatæ scariosæ. Perianthium albido-viridulum 15–18 lin. longum, segmentis tubo ½–1 lin. crasso æquilongis. Antheræ flavæ inclusæ 1½ lin. longæ. Stylus demum leviter exsertus. *India orientalis et Africa tropicalis et capensis.* S. ENSIFOLIA, GRANDICUSPIS, et PUMILA, *Haworth*, et S. STENOPHYLLA, *Link, Kunth, Enum.* v. 20, sunt verisimiliter formæ hortenses hujus speciei.

7. S. ROXBURGHIANA, *Schult. fil. Syst.* vii. 357; *Kunth, Enum.* v. 18. —S. zeylanica, *Roxb. Pl. Corom.* ii. 45, t. 184, *quoad tabulam.* Habitus omnino *S. zeylanicæ* sed minor. Folia ex nodo 4–8 subteretia ensiformia subpedalia 6–8 lin. lata, albo-fasciata anguste rubro-marginata ad apicem attenuata. Scapus gracilis flexuosus foliis brevior. Racemus laxus 6–12-pollicaris expansus 12–15 lin. latus. Pedicelli 3–5ni, 1½–2 lin. longi medio articulati. Perianthium albidum 5–6 lin. longum, segmentis tubo æquilongis. Antheræ ½ lin. longæ. Stylus leviter exsertus. *India orientalis peninsularis*, Rottler!

8. S. LANUGINOSA, *Willd. Sp.* ii. 160 (*Rheed. Malab.* ii. 83, t. 42); *Kunth, Enum.* v. 19. Habitus omnino *S. zeylanicæ.* Folia ensiformi-subteretia 4-pedalia acuminata rigida dorso striis longitudinalibus lanuginosis notata. Racemus pedalis et ultra. Pedicelli 3–5ni, 2–3 lin. longi. Perianthium 1 poll. longum, segmentis tubo æquilongis. *India orientalis* (non vidi).

9. S. EHRENBERGII, *Schwein. Plant. Nub. Exsic.* 1865, no. 31. Folia medio subteretia, basi 9–12 lin. lata, centro ½ poll. crasso irregulariter profunde verticaliter sulcata, marginibus planis distincte rubro-lineatis. Racemi pedales sublaxi expansi 1 poll. lati. Pedicelli 3–6ni graciles ascendentes 1½–2 lin. longi supra medium articulati. Perianthium albidum, segmentis tubum gracillimum supra ovarium constrictum paulo superantibus. Filamenta filiformia 3 lin. longa. Stylus ½–1 lin. exsertus. *Inter Atbara et Mare rubrum*, Schweinfurth!

10. S. CYLINDRICA, *Bojer, Hort. Maur.* 349; *Hook. Bot. Mag.* t. 5093. —S. angolensis, *Welw. Herb. Angol.*—S. sulcata, *Bojer in Herb. Kew.*

Folia ex nodo 3 vel 5 exteriora parva, arcuata cylindrica 3–4-pedalia, 1 poll. crassa rigide coriacea verticaliter sulcata horizontaliter fasciata ad apicem acuminata intus prope scapum excavata. Scapus subpedalis firmus. Racemus 2–2½-pedalis subdensus expansus 2½–3 poll. crassus. Pedicelli 6–8ni, 2–4 lin. longi medio articulati. Bracteæ scariosæ lanceolatæ maximæ 3–6 lin. longæ. Perianthium albidum, 12–15 lin. longum segmentis tubo gracillimo subæquilongis. Antheræ pallide luteæ demum exsertæ 1½–2 lin. longæ. Stylus 2–3 lin. exsertus. *Africa austro-tropicalis ab insula Zanzibar ad Angolam.* Sæpe in hortis nostris culta.

5. Lomatophyllum, *Willd.*

Willd. Berl. Mag. v. 166; *Schult. fil. Syst.* vii. 706; *Endlich. Gen.* no. 1116; *Kunth, Enum.* iv. 549.—Phylloma, *Gawl. Bot. Mag.* t. 1585, *Haworth, Syn. Succ. Suppl.* 43.—Aloë, sp., *auct.* —Dracæna, sp., *Aiton.*

Perianthium tubulosum, flavo-rubro-viride, segmentis ligulatis diutine imbricatis tubo campanulato 3–4plo longioribus apice leviter reflexis, dorso trinervatis. *Stamina* 6 inclusa vel leviter exserta hypogyna 3 paulo longiora, filamentis filiformibus leviter declinatis, antheris parvis oblongis versatilibus dorsifixis introrsis. *Ovarium* sessile obovoideum triloculare, ovulis in loculo pluribus biseriatis; stylus elongatus subrectus filiformis; stigma capitatum. *Bacca* carnosa, seminibus in loculo paucis, testa nigra nitida. *Suffrutices carnosæ Mascaranenses habitu et perianthio omnino* Aloës *sed foliis rubro-marginatis et fructu baccato recedentes.*

Genitalia exserta .... 1. *L. rufocinctum.*
Genitalia inclusa.
  Folia densa 2–3-pedalia .... 2. *L. borbonicum.*
  Folia laxa pedalia .... 3. *L. macrum.*

1. L. rufocinctum, *Salmdyck in Schult. fil. Syst. Veg.* vii. 1715; *Kunth, Enum.* iv. 549.—Aloë rufocincta, *Haworth, Suppl. Pl. Succ.* 45; *Revis.* 41. Folia 20 et ultra in rosulam sessilem congesta ascendentia ensiformia bipedalia, deorsum 2½–3 poll. lata, acuminata viridia canaliculata rubro-marginata dentibus minutis corneis albis serrata. Scapus subpedalis, racemis 1–3 laxis ½–1-pedalibus 12–15 lin. crassis. Pedicelli ascendentes 6–9 lin. longi. Bracteæ minutæ evanescentes. Perianthium 6 lin. longum, genitalibus exsertis. *Patria ignota, verisimiliter Mauritius.*

2. L. borbonicum, *Willd. Berl. Mag.* v. 166; *Schult. fil. Syst.* vii.

361; *Kunth, Enum.* iv. 549.—Aloë purpurea, *Lam. Encyc.* i. 85.—
—A. marginata, *Willd. Enum.* 382.—A. marginalis, *DC.*; *Plant, Grasses*, t. 31.—Phylloma aloïflorum, *Gawl. Bot. Mag.* t. 1585.—P. borbonicum, *Haworth, Syn. Succ. Suppl.* 43. Caudex demum 6–8-pedalis crassitie cruris humani. Folia 12–20 dense rosulata ensiformia 2–3-pedalia, 2–3 poll. lata acuminata saturate viridia distincte rubro-marginata dentibus crebris deltoideis corneis serrata. Racemi simplices vel sæpe terni semipedales. Pedicelli inferiores 6–9 lin. longi. Bracteæ lanceolatæ 2–3 lin. longæ. Perianthium 8–9 lin. longum, segmentis interioribus latioribus magis ligulatis. Genitalia perianthio æquilonga, stylo semipollicari, antheris ½ lin. longis. *Bourbon et Mauritius ad montes aridos.*

3. L. MACRUM, *Salmdyck in Schult. fil. Syst.* vii. 1715; *Kunth, Enum.* iv. 549.—Aloë macra, *Haworth, Suppl. Pl. Succ.* 45 & 105; *Revis.* 42. Breviter caulescens, foliis 10–12 laxis patulis vel exterioribus recurvatis ensiformibus pedalibus, deorsum 9–12 lin. latis acuminatis medio 1½ lin. crassis rubro-marginatis minute serratis facie canaliculatis. Scapus lateralis vel terminalis subpedalis simplex vel furcatus. Racemi subdensi 20–30-flori, 4–6 poll. longi, 1½–2 poll. lati. Pedicelli ascendentes 3–6 lin. longi. Bracteæ lanceolatæ scariosæ 2–3 lin. longæ. Perianthium 6–9 lin. longum, genitalibus inclusis. *Mauritius.*

Tribus III. CONVALLARIEÆ.

6. REINECKIA, *Kunth.*

Kunth in Act. Acad. Berol. 1842, 29, *Enum.* v. 21.—Sanseviella, *Reich. Conspect.* 44 (*nomen*).—Liriope, *Salisb. Gen.* 74, *non Lour.*—Sanseviera, sp., *Andrews etc.*

Perianthium tubulosum corollinum marcescens segmentis 6 æqualibus ligulatis tubo cylindrico æquilongis flore expanso patentibus. *Stamina* 6 inclusa, filamentis filiformibus ad faucem tubi uniseriatim insertis, antheris oblongis bilocularibus apice et basi emarginatis, supra basin dorsifixis, secus latera dehiscentibus. *Ovarium* sessile ampullaceum triloculare, ovulis in loculo paucis superpositis; stylus erectus filiformis; stigma capitatum. *Bacca* globosa, seminibus in loculo sæpissime solitariis, testa fusca, albumine corneo.

1. R. CARNEA, *Kunth, loc. cit.*—Sanseviera carnea, *Andrews, Bot. Rep.* t. 361, *Red. Lil.* t. 323.—S. sessiliflora, *Gawl. Bot. Mag.* t. 739, *Herb. Amat.* t. 124.—S. sarmentosa, *Jacq. Fragm.* 68, t. 102. f. 83, t. 132. fig. 4.—S. rosea, *Dietr. Gart. Lex.* viii. 504. Rhizoma late

repens, foliis ex nodis distantibus 6–12 suberectis glabris arundinaceis viridibus multistriatis semipedalibus vel pedalibus, supra medium 6–9 lin. latis. Scapus firmus 1–2-pollicaris. Spicæ 1½–2-pollicares densifloræ. Bracteæ membranaceæ deltoideo-cuspidatæ rubro-tinctæ magnæ. Perianthium suaveolens rubellum 3–4 lin. longum. Bacca rubra 3–4 lin. crassa. *China et Japonia* (in hortis nostris frequens).

7. Convallaria, *Linn.*

Linn. Gen. no. 425 *ex parte, Neck. Elem.* iii. 189, *Desf. Ann. Mus.* ix. 54, *Endlich. Gen.* no. 1182, *Kunth, Enum.* v. 130.—Polygonatum, *All. Ped.* i. 130, *ex parte.*—Lilium convallium, *Tourn. Inst.* 77, t. 14; *Moench, Meth.* 636.

Perianthium album corollinum campanulatum, segmentis 6 æqualibus delitoideis uninerviis tubo æqualibus. *Stamina* 6 inclusa, filamentis deltoideis prope basin tubi insertis, antheris lanceolatis dorsifixis versatilibus introrsis. *Ovarium* sessile ovoideum triloculare, ovulis in loculo 4–6; stylus filiformis persistens ovario æquilongus; stigma punctiforme. *Bacca* globosa carnosa seminibus 4–6 turgidis, albumine firmo, testa sordide brunnea.

1. C. majalis, *Linn. Sp.* 451; *Flor. Dan.* t. 854; *Eng. Bot.* t. 1035; *Red. Lil.* t. 227; *Hayne, Arzneik.* iii. 18; *Reich. Ic. Germ.* t. 960; *Kunth, Enum.* v. 131.—Polygonatum maiale, *All. Ped.* i. 130. Herba semipedalis vel pedalis. Rhizoma obliquum copiose fibrosum stoloniferum. Petioli 3–4-pollicares, cum scapo vaginis pluribus arcte cincti. Folia 2 (raro 1) oblonga acuta 4–6 poll. longa membranacea costata venis crebris curvatis inæqualibus. Scapus petiolos superans. Racemus laxe 6–12-florus pedicellis solitariis diutine cernuis apice articulatis 3–6 lin. longis. Bracteæ albidæ persistentes. Perianthium 3–4 lin. longum et latum album vel rubro tinctum. Bacca globosa coccinea 3–4 lin. crassa. *Per Europam totam et Sibiriam ad Japoniam; America borealis ad montes Virginiæ et Carolinæ.* C. keiskei, *Miquel, Ann. Mus. Lug. Bat.* iii. 148, ex descriptione, est varietas minor tenera Japonica nervis foliorum tenuibus subæqualibus. C. latifolia, *Miller*, est forma robusta hortensis flore pleno rubello.

8. Polygonatum, *Tourn.*

Tourn. Inst. 78, t. 14; *All. Ped.* 131 (*excl. sp.*); *Moench, Meth.* 637; *Desf. Ann. Mus.* iv. 48; *Endlich. Gen.* no. 1181; *Kunth, Enum.* v. 131.—Evallaria, *Neck. Elem.* no. 1551 (*excl. sp.*).—Axillaria, *Rafin. Journ. Phys.* 89, 102.—Campydorum, *Salisb. Gen.* 64.—Convallaria, *Linn. et auct. mult. ex parte.*

Perianthium cylindricum corollinum, segmentis 6 subæqualibus deltoideis vel lanceolatis ascendentibus uninerviis tubo cylindrico brevioribus. *Stamina* 6 inclusa, filamentis brevibus leviter applanatis vel subnullis supra medium tubi uniseriatis, antheris linearibus dorsifixis versatilibus secus margines dehiscentibus. *Ovarium* sessile oblongum triloculare, ovulis in loculo paucis horizontalibus; stylus elongatus filiformis; stigma punctiforme. *Bacca* globosa seminibus in loculo 1–2 globosis albumine corneo testa brunnea. *Herbæ caulescentes late crasse rhizomatosæ, foliis alternis vel oppositis vel verticillatis sæpissime latis membranaceis crebre verticaliter nervosis costatis, floribus axillaribus solitariis vel corymbosis sæpissime albidis segmentis viridibus apice ciliatis, pedicellis apice articulatis. Regiones boreali-temperatæ totius orbis.*

Alternifolia. Folia omnia semper alterna.
Flores multi in umbellam breviter pedunculatam dispositi .... 1. *P. umbellatum.*
Flores pauci corymbosi vel solitarii pedunculo communi brevi.
Perianthium 2–3 lin. crassum ...... 2. *P. officinale.* 3. *P. japonicum.* 4. *P. latifolium.*
Perianthium $1\frac{1}{2}$–2 lin. crassum ...... 5. *P. multiflorum.* 6. *P. falcatum.* 7. *P. Maximowiczii.* 8. *P. brevistylum.* 9. *P. biflorum.* 10. *P. polyanthemum.*
Flores pauci corymbosi pedunculo communi elongato. 11. *P. nervulosum.* 12. *P. macropodum.*

Oppositifolia. Folia sæpissime opposita, raro sparsa vel ternata.
Humilia foliis membranaceis floribus violaceis. 13. *P. graminifolium.* 14. *P. Hookeri.*
Elata foliis membranaceis floribus albidis 15. *P. geminiflorum.* 16. *P. Griffithii.*
Elata foliis firmis nitidis floribus albidis 17. *P. Cathcartii.* 18. *P. oppositifolium.* 19. *P. punctatum.*

Verticillata. Folia omnia vel suprema verticillata.
Folia suprema verticillata inferiora sparsa. 20. *P. roseum.* 21. *P. Sewerzowi.*
Folia omnia verticillata apice recta ..... 22. *P. verticillatum.*
Folia omnia verticillata apice cirrhifera .. 23. *P. sibiricum.*

1. P. UMBELLATUM, *Baker.*—Convallaria umbellata, *Bunge in Herb. Imp. Acad. Petrop.* Caulis glaber 2–3-pedalis. Folia 10–15 alterna

oblonga membranacea glabra undulata 2–3 poll. longa ad basin latam spathulatim angustata costata, utrinque venis longitudinalibus inæqualibus, venulis transversalibus obviis. Flores ex axillis centralibus 10–20 dense umbellati, pedunculo communi 15–18 lin., pedicellis 3–4 lin. longis. Bracteæ ad basin pedicellorum minutæ lineares. Perianthium 2 lin. longum, segmentis tubo duplo brevioribus. *China borealis.*

2. P. OFFICINALE, *All. Ped.* i. 131.—P. vulgare, *Desf. Ann. Mus.* ix. 49; *Red. Lil.* t. 258; *Kunth, Enum.* v. 132.—P. anceps, *Moench, Meth.* 637.—P. uniflorum, *Jaume, Gall.* t. 346.—P. glaberrimum, *K. Koch, Linn.* xxii. 267.—Convallaria Polygonatum, *Linn. Sp.* 451; *Eng. Bot.* t. 280; *Fl. Dan.* t. 377; *Curt. Fl. Lond.* t. 38; *Reich. Ic. Germ.* t. 964.—Evallaria polygonata, *Neck. Elem.* iii. 189.—Convallaria odorata, *Mill. Dict.* no. 3. Caulis glaber angulatus 1–1½-pedalis dimidio inferiore nudo. Folia 8–12 alterna oblonga 2–3 poll. longa, eis *multiflori* firmiora, distincte costata, venis inæqualibus, venulis transversalibus occultis, utrinque glabra, supra viridia, subtus glauca. Flores ex axillis solitarii vel gemini pedicellis 6–9 lin. longis. Perianthium 9–12 lin. longum, tubo albo 2–3 lin. crasso supra ovarium haud constricto, segmentis viridibus imbricatis oblongo-deltoideis 2 lin. longis. Stamina supra medium tubo inserta, filamentis applanatis glabris antheris æquilongis. Bacca atro-cærulea 3 lin. crassa. *Per Europam totam, Sibiriam et Himalayas occidentales.*

Var. HUMILE, *Baker.*—P. humile, *Fisch. in Maxim. Prim. Amur.* 275. Caulis 3–6-pollicaris, flexuosus, foliis 6–8 parvis ascendentibus subtus viridibus puberulis, floribus solitariis 6–7 lin. longis, filamentis papillosis. *Davuria et Amurland,* Maximowicz; *insula Sachalin,* Glehm!

3. P. JAPONICUM, *Morren et Decne. Ann. Sc. Nat.* ser. 2, vol. ii. p. 311; *Kunth, Enum.* v. 133.—Glaberrimum, caule pedali vel sesquipedali valde angulato triente inferiore nudo. Folia 10–12 alterna ascendentia oblonga 2–3 poll. longa acuta supra obscure subtus distincte glauca textura eorum *multiflori* distincte costata, venis crebris inæqualibus, venulis transversalibus occultis. Flores ex axillis 1–3 cernui, pedunculis et pedicellis ebracteatis 3–6 lin. longis. Perianthium 9–12 lin. longum tubo albo 3 lin. crasso, dentibus deltoideis viridibus tubo 3–4plo brevioribus. Stamina supra medium tubi inserta, filamentis cum costis glaberrimis antheris æquilongis. Stylus 8–9 lin. longus. *Japonia et insula Tsus-Sima,* C. Wright! Wilford! V. v. in Hort. Kew. ad finem Aprilis florens.

4. P. LATIFOLIUM, *Desf. Ann. Mus. Par.* ix. 50; *Red. Lil.* t. 243; *Kunth, Enum.* v. 138; *A. Gray, Man.* edit. 5, 531.—Convallaria latifolia, *Jacq. Austr.* iii. t. 232; *Willd. Sp.* ii. 162; *Reich. Ic. Germ.* t. 965.—Convallaria hirta, *Bosc, in Poir. Ency.* iv. 369; *Schult. fil. Syst.* vii.

300.—Polygonatum hirtum, *Pursh, Flora*, i. 234; *Kunth, Enum.* i. 140. Caulis 2–4-pedalis superne puberulus. Folia 10–15 alterna oblonga basi cite angustata acuta vel subobtusa 3–6 poll. longa costata crebre inæqualiter nervata venulis transversalibus haud perspicuis supra viridia glabra subtus pallidiora puberula. Flores ex axillis cernui 1–5, pedicellis et pedunculis 3–6 lin. longis haud bracteatis. Perianthium 7–9 lin. longum tubo albo 2–2½ lin. crasso haud constricto segmentis viridibus 1½–2 lin. longis late imbricatis. Filamenta supra medium tubi inserta, antheris æquilonga, cum nervis interioris perianthii glabra vel obscure papillosa. *Austria, Italia, Tauria, Pennsylvania.* Inter *multiflorum* et *officinale* medium tenens habitu et floribus corymbosis prioris, perianthio magno et filamentis glabris posterioris.

Var. COMMUTATUM, *Baker* (Convallaria commutata, *Schult. fil. Syst.* vii. 1671.—Polygonatum commutatum, *Dietr. in Otto, Gart.* 1835, no. xxviii. 223, *Kunth, Enum.* v. 135.—P. giganteum, *Dietr. in Otto, Gart.* 1835, no. xxviii. 222; *Kunth, Enum.* v. 136; *A. Gray, Man.* edit. 5, 531.—P. Thunbergii, *Morren & Dec. Ann. Sc. Nat.* ser. 2, vol. ii. p. 312; *Kunth, Enum.* v. 133.—P. canaliculatum, *Miq. Ann. Mus. Bat.* iii. 148, *non Pursh.*—P. multiflorum, var. americanum, *Hook. Flor. Bor.-Am.* ii. 176, *ex parte*, e Japonia et America boreali-orientali), ab typo vix differt nisi caule et foliis glabris.

5. P. MULTIFLORUM, *All. Ped.* i. 131; *Moench, Meth.* 637; *Desf. Ann. Mus. Par.* ix. t. 50; *Red. Lil.* t. 229; *Kunth, Enum.* v. 138, *excl. pl. Amer.*—Convallaria multiflora, *L. Sp.* 452; *Fl. Dan.* t. 152; *Eng. Bot.* t. 279; *Hook. Lond.* t. 37; *Reich. Ic.* t. 961, 962.—C. govaniana, *Wall. Cat.* 5137. Caulis glaber 2–3-pedalis, dimidio inferiore nudo. Folia 10–15 alterna oblonga basi cite angustata acuta 3–6 poll. longa supra viridia subtus glauca distincte costata inæqualiter nervata venulis transversalibus obscuris. Flores 1–5 ex axillis multis cernuis, pedunculis et pedicellis 6–12 lin. longis, bracteis nullis. Perianthium 6–8 lin. longum, tubo albo medio constricto 1–1½ lin. crasso, segmentis viridibus oblongis 1½–2 lin. longis. Filamenta supra medium tubi inserta, 1–1½ lin. longa, cum nervis interioris perianthii dense pilosa. Bacca globosa 3-4 lin. crassa. *Per Europam totam et Sibiriam; Japonia, regio temperata Himalayæ occidentalis.*

Var. BRACTEATUM, *Kunth, Enum.* v. 139; *Reich. Ic.* t. 963.—Convallaria bracteata, *Thomas in Gaud. Fl. Helv.* ii. 531.—Polygonatum bracteatum, *Dietr. in Otto, Gartenzeit.* 1838, no. 28, 223. Pedicelli basi bracteis magnis lanceolatis præditi. *Helvetia*, Thomas!

Var. BROTERI, *Baker* (Convallaria Broteri, *Guss. Syn. Sic.* i. 416, iii. 148), est forma ad *P. latifolium* accedens perianthio 9–10 lin. longo medio vix constricto. *Sicilia*, Tineo!

Var. INTERMEDIUM, *Baker* (P. intermedium, *Boreau, Flore du Centre,*

edit. 3, 615.—P. officinale β. intermedium, *Syme, Eng. Bot.* edit. 3, ix. 179.—P. ambiguum, *Link*?) est forma inter *officinale* et *multiflorum* medium tenens perianthio crasso prioris, caule cylindrico, floribus 2–3nis et filamentis ciliatis posterioris. *Gallia centralis,* Boreau; *Anglia, in comitatu Wilts,* Flower.

6. P. FALCATUM, *A. Gray, Bot. Jap.* 414; *Miquel, Ann. Mus. Lug.-Bat.* iii. 148. Caulis teres glaber 1–2½-pedalis. Folia alterna lanceolata 4–7 poll. longa glabra breviter petiolata falcata e basi ad apicem sensim angustata. Flores ex axillis foliorum 2–6 pedunculis brevibus. Perianthium flavidum. Filamenta vix applanata glanduloso-scabra. *Japonia,* Wright, Keiske (non vidi).

7. P. MAXIMOWICZII, *F. Schmidt.* Habitus omnino *P. multiflori.* Caulis 2–3-pedalis glaber sursum valde flexuosus. Folia 12–14 ascendentia alterna oblonga membranacea 3–4 poll. longa basi cite angustata supra viridia glabra subtus glauca puberula, distincte costata venis tenuibus inæqualibus. Flores ex axillis 1–2 cernui pedunculis et pedicellis ebracteatis 6–9 lin. longis. Perianthium 9 lin. longum, tubo albido e basi ad oram 2 lin. crassam sensim ampliato, segmentis 2 lin. longis viridibus. Filamenta prope apicem tubi inserta subnuda, antheris ex fauce protrusis. *Insula Sachalin in parte australi prope Dai,* Glehn!

8. P. BREVISTYLUM, *Baker.* Caulis pedalis vel sesquipedalis, glaber, sulcatus, purpureo-maculatus, triente inferiore nudo. Folia 13–15 alterna oblonga acuta patula brevissime petiolata, 2–4 poll. longa, eis *multiflori* firmiora supra viridia subtus glauca distincte costata venis longitudinalibus inæqualibus minus conspicuis venulis transversalibus occultis. Flores ex axillis multis 2–4 patuli vel cernui pedunculis 3–15 lin., pedicellis haud bracteolatis 3–6 lin. longis. Perianthium flavidum 7–8 lin. longum, tubo 2 lin. crasso haud constricto, segmentis viridulis 1½ lin. longis. Stylus ovario brevior. Filamenta non vidi. *Sikkim in regione temperata ad Lepcha,* Dr. Hooker! (exempla et icon inedita).

9. P. BIFLORUM, *Elliott, Bot.* i. 393; *A. Gray, Man.* edit. 5, 531; *Chapman, Flora,* 481.—Convallaria biflora, *Walt. Car.* 122.—P. pubescens, *Pursh, Flora,* i. 234; *Kunth, Enum.* v. 136.—Convallaria pubescens, *Willd. Hort. Berol.* i. 45.—P. canaliculatum, *Pursh, Flora,* i. 234.—Convallaria canaliculata, *Willd. Hort. Berol.* 45.—P. multiflorum, *Kunth, Enum.* v. 138, *quoad plantam Americanam.*—P. multiflorum, var. americanum, *Hook. Flor. Bor.-Amer.* ii. 176, *ex parte.* Caulis 1–3-pedalis superne puberulus. Folia 10–15 alterna oblonga basi cite angustata acuta tenuiter membranacea 2–4 poll. longa supra viridia glabra subtus glauca puberula distincte costata venis crebris inæqualibus venulis transversalibus haud perspicuis. Flores 1–3 ex

axillis multis cernui, pedunculis et pedicellis 3–6 lin. longis, bracteis nullis. Perianthium 5–6 lin. longum, tubo albo supra ovarium haud constricto 1–1½ lin. crasso, segmentis viridibus deltoideis. Filamenta supra medium tubi inserta, antheris breviora, cum costis interioris perianthii puberula. *America borealis orientalis.*—P. ANGUSTIFOLIUM, *Pursh, Flora,* i. 234, est forma foliis lanceolatis subtus vix puberulis.—P. PARVIFLORUM, *Dietr. in Otto, Gartenzeit.* 1835, 222, *Kunth, Enum.* v. 140, est forma parviflora foliis glabris.

10. P. POLYANTHEMUM, *Dietr. in Otto, Gartenzeit* 1835, no. xxviii. 223; *Kunth, Enum.* v. 137.—Convallaria polyanthema, *M. Bieb. Flor. Taur.* iii. 272; *Schult. Syst.* vii. 302.—P. orientale, *Desf. Ann. Mus.* ix. 50, t. 7; *Kunth, Enum.* v. 140; *Jaub. et Spach, Ill.* t. 441.—Convallaria orientalis, *Schult. fil. Syst.* vii. 303.—P. orientale latifolium flore parvo, *Tournef. Cor.* 1. Caulis glaber 2–3-pedalis dimidio inferiore nudo. Folia 10–20 alterna glabra oblonga acuta 2–4 poll. longa basi cite angustata distincte costata inæqualiter nervata nervulis transversalibus haud perspicuis supra viridia glabra subtus glauca puberula. Flores ex axillis foliorum 2–4 cernui vel patuli pedunculis brevissimis pedicellis ebracteatis 3–6 lin. longis. Perianthium 4½–6 lin. longum, tubo albo supra ovarium constricto 1 lin. crasso, segmentis viridibus deltoideis 1 lin. longis. Filamenta supra medium tubi inserta ciliata antheris æquilonga. *Caucasus, Tauria, Persia borealis.*

11. P. NERVULOSUM, *Baker.* Glaber caule flexuoso sulcato 2–3-pedali. Folia 10–13 distantia alterna oblonga insigniter cuspidata 3–6 poll. longa basi in petiolum brevem canaliculatum angustata membranacea modice firma utrinque viridia glaberrima distincte costata venis longitudinalibus crebris inæqualibus nervulis transversalibus distincte obviis connexis. Flores ex axillis multis 2–3 pedunculis gracillimis ascendentibus vel cernuis 1½–3 poll. longis, pedicellis haud bracteolatis 3–6 lin. longis. Flores non vidi. Bacca ei *oppositifolii* similis parva globosa 2–3 lin. crassa epicarpio tenui siccitate brunneo, seminibus parvis globosis 2–5. *Sikkim regio temperata ad Lachong,* Dr. Hooker! *Bhotan,* Griffith, 5850!

12. P. MACROPODUM, *Turcz. Decad. Plant. Chin.* 26; *Kunth, Enum.* v. 140.—Affine *P. multifloro.* Glabrum, caule teretiusculo, foliis ovato-oblongis alternis semiamplexicaulibus, pedunculis folio subæquilongis multifloris, pedicellis flore subbrevioribus basi bracteolatis, filamentis pubescentibus. *China borealis.* (Non vidi.)

13. P. GRAMINIFOLIUM, *Hook. Ic.* t. 833. Glaber caule semipedali dimidio inferiore nudo. Folia conferta, infima solitaria, reliqua opposita, linearia, obtusa, glabra, 1½–2 poll. longa, 1½–2 lin. lata. Flores ex

axillis gemini, pedunculis et pedicellis 3–6 lin. longis. Perianthium violaceum 4–5 lin. longum, segmentis oblongis tubo 2 lin. crasso paulo brevioribus. Antheræ prope faucem tubi subsessiles. *Himalaya occidentalis in regione alpina ad Barung, alt.* 11000 *pedes,* Col. Munro.

14. P. HOOKERI, *Baker.* Herba 1–2-pollicaris foliis 10–15 confertis oppositis vel infimis alternis ascendentibus linearibus sessilibus 9–15 lin. longis $1\frac{1}{2}$–3 lin. latis membranaceis glabris graciliter nervatis costatis supra viridibus subtus glaucis. Flores ad caulem semper solitarii ascendentes pedicellis $1\frac{1}{2}$–2 lin. longis. Perianthium violaceum 8–10 lin. longum, segmentis lanceolatis tubo cylindrico 1 lin. crasso duplo brevioribus. Antheræ prope medium tubi subsessiles oblongæ 1 lin. longæ. *Sikhim regio alpina ad Lachen,* 10000–11000 *pedes,* Dr. Hooker (exempla et icon inedit.). = *Polygonatum,* no. 8, Hk. fil. et Thoms. distr.

15. P. GEMINIFLORUM, *Decne. in Jacquem. Voy. Ind. Or.* 170, t. 170; *Kunth, Enum.* v. 852. Caulis pedalis vel sesquipedalis superne puberulus flexuosus triente inferiore nudo. Folia 20–40 lanceolata 2–4 poll. longa basi cuneata acuta membranacea supra viridia glabra subtus glauca venis ciliatis distincte costata venis crebris gracilibus æqualibus venulis transversalibus occultis ascendentia opposita vel ternata raro solitaria. Flores ex axillis gemini pedunculis et pedicellis 3–6 lin. longis, bracteolis minutis lineari-subulatis caducis. Perianthium 5–6 lin. longum, tubo albo 2 lin. crasso, segmentis viridibus tubo 2–3plo brevioribus. Antheræ supra medium tubi insertæ, filamentis brevissimis glabris. Stylus ovario æquilongus. *Himalayæ occidentalis regio temperata* (*Lahul, Kunawar, etc.*), Jacquemont, Thomson! Jaeschke!

16. P. GRIFFITHII, Baker. Glaber, caule gracillimo tripedali dimidio inferiore nudo. Folia opposita distantia sessilia ascendentia acuminata 2–4 poll. longa 6–9 lin. lata distincte trinervata, venis intermediis minus obviis, venulis transversalibus occultis, supra viridia, subtus glauciuscula. Flores ex axillis gemini, pedunculis et pedicellis ascendentibus vel cernuis ebracteolatis 6–9 lin. longis. Perianthium albidum cylindricum 8–9 lin. longum, tubo 2 lin. crasso supra ovarium constricto, segmentis viridulis brevissimis deltoideis. Stamina ad apicem tubi inserta, antheris minutis, filamentis brevissimis nudis. Stylus filiformis, ovarium 2–3plo superans. *Himalaya orientalis ad Laimplangthaya, alt.* 6000 *pedes,* Griffith 5846! Plantam affinem in Him. orientali Thomson legit foliis lateralibus geminis vel ternis, terminalibus verticillatis, floribus geminis pedicellis patulis vel ascendentibus, gracillimis cum pedunculo 15–18 lin. longis; sed perianthium non vidi.

17. P. CATHCARTII, *Baker*. Glaberrimum, caule 2–3-pedali purpureo-maculato triente vel quadrante inferiore nudo. Folia 16–20 omnia opposita patula oblonga acuminata 2–4 poll. longa eis *multiflori* firmiora basi minute petiolata supra viridia subtus glauca distincte costata venis 2–3 utrinque costam exsculptis, reliquis longitudinalibus gracilibus, venulis transversalibus obscuris. Flores ex axillis 2–4ni, pedunculis et pedicellis ebracteolatis 6–18 lin. longis cernuis vel patulis. Perianthium 7–8 lin. longum flavidum tubo haud constricto 2 lin. crasso segmentis deltoideis viridulis. Stylus ovario æquilongus. Antheræ prope faucem tubi inserta filamentis brevissimis nudis. Bacca 3 lin. crassa, epicarpio tenui siccitate brunneo. *Sikkim in sylvis ad Lachen* (regione temperata) 8000–10000 pedes. Dr. Hooker! Icon Cathcart. inedit. = *Polygonatum* no. 3, Hk. fil. et Thoms. distrib.

18. P. OPPOSITIFOLIUM, *Royle, Ill. Him.* i. 380; *Kunth, Enum.* v. 141. —Convallaria oppositifolia, *Wall. Asiat. Res.* xiii. 380. *cum icone, Cat.* 5134; *Don, Prodr. Nep.* 47; *Lodd. Bot. Cab.* t. 640; *Hook. Exot. Flora*, t. 125, *Bot. Mag.* t. 3529. Glaberrimum caule 2–4-pedali sulcato triente inferiore nudo. Folia 10–20 et ultra patula oblonga acuminata brevissime petiolata omnia opposita raro alterna 3–6 poll. longa, eis *multiflori* crassiora rigidiora, supra nitide viridia subtus pallidiora, distincte costata, venis crebris inæqualibus distinctis, venulis rectis transversalibus siccitate perspicuis connexis. Flores ex axillis multis 4–10 in corymbos oppositos dispositi, pedunculis et pedicellis 6–12 lin. longis. Perianthium 6–9 lin. longum, tubo albo pulchre rubro-costato 2 lin. crasso, segmentis deltoideis viridulis. Stamina supra medium tubi inserta, filamentis papillosis, antheris e fauce protrusis. Stylus ovarium duplo superans. Bacca coccinea 3 lin. crassa; ovula in loculo 6–8. *Himalayæ orientalis regio temperata* (*Nepaul, Sikkim, Khasia, Assam*), Wallich! Hook. fil. et Thomson! Icon inedit. Cathcart! Griffith 5845! 5847!

Var. DECIPIENS, *Baker*. Folia lanceolata longe acuminata petiolo distincto 1–3 lin. longo prædita, supra medium 6–12 lin. lata, 3–4 poll. longa, inferiora alterna, superiora opposita. *Sikkim*, Dr. Hooker!

19. P. PUNCTATUM, *Royle, Ill. Him.* i. 380; *Kunth, Enum.* v. 142; *Hook. Bot. Mag.* t. 5061.—Convallaria punctata, *Wall. Cat.* 5133. Glaberrimum, caule 1–2-pedali angulato sulcato triente inferiore nudo. Folia 12–20 ascendentia omnia opposita raro alterna oblongo-lanceolata 2–3 poll. longa, medio 6–9 lin. lata acuta basi cuneata breviter petiolata rigide subcoriacea supra nitide viridia subtus pallidiora distincte costata venis crebris gracillimis eis specierum aliarum multo minus perspicuis 2 utrinque costam validioribus venulis transversalibus occultis. Flores ex axillis multis 2–3 cernui pedunculis et pedicellis

2–4 lin. longis. Perianthium 3–4 lin. longum, tubo urceolato albo lilacino-punctato, segmentis deltoideis viridibus. Stamina supra medium tubi inserta filamentis brevissimis glabris. Stylus ovario æquilongus. *Himalayæ orientalis regio temperata* (*Nepaul, Sikkim, Bhotan*), Wallich! Dr. Hooker! Icon Cathcart. inedit.! Griffith 5848! Bot. Mag. t. 5061, est forma foliis alternis.

20. P. ROSEUM, *Kunth, Enum.* v. 144.—Convallaria rosea, *Led. Icones*, t. 1; *Flor. Ross.* iv. 123; *Hook. Bot. Mag.* t. 5049; *Schult. fil. Syst.* vii. 1669. Glaberrimum, caule 2–3-pedali sulcato triente inferiore nudo. Folia ascendentia linearia vel lanceolata acuminata basi subpetiolata 3–5 poll. longa, medio 6–9 lin. lata, superiora opposita vel ternata, suprema ad apicem caulis verticillata, infima sparsa, membranacea, utrinque glabra, supra viridia, subtus pallidiora vel glauca, distincte costata, venis præter costam gracillimis immersis. Flores gemini ex axillis cernui pedicellis brevissimis, pedunculis 3–6 lin. longis. Perianthium roseum 5–6 lin. longum, tubo cylindrico 1 lin. crasso, dentibus brevibus lanceolatis. Stamina supra medium tubi inserta filamentis papillosis. Stylus ovarium triplo superans. Bacca globosa 3–4 lin. crassa. *Siberia centralis meridionalis* (*Altai, Alatau, Songaria*).

21. P. SEWERZOWI, *Regel, Enum. Semenow*, 113. Glaber caule robusto tripedali. Folia glabra sessilia acuminata 4–6 poll. longa, superiora ternata lineari-lanceolata ½ poll. lata, inferiora oblongo-lanceolata sparsa 12–20 lin. lata. Pedunculi solitarii cernui 1–2-flori 12–15 lin. longi bracteolis linearibus instructi. Perianthium 7–8 lin. longum, filamentis papillosis. *Turkestan*, Sewerzow. (Non vidi. An sit varietas major *P. rosei*?)

22. P. VERTICILLATUM, *All. Ped.* i. 131; *Desf. Ann. Mus. Par.* ix. 49; *Red. Lil.* t. 244; *Kunth, Enum.* v. 142.—Convallaria verticillata, *Linn. Sp.* 451; *Flor. Dan.* t. 86; *Eng. Bot.* t. 128; *Reich. Ic. Germ.* t. 966.—Evallaria verticillata, *Neck. Elem.* iii. 189.—Campydorum verticillatum, *Salisb. Gen.* 64.—P. leptophyllum, *Royle, Ill. Him.* i. 380.—Convallaria leptophylla, *D. Don, Prod. Nep.* 47.—P. Jacquemontianum, *Kunth, Enum.* v. 143. Caulis glaber 2–3-pedalis angulatus sulcatus. Folia permulta patula, per 4–8 in verticillos disposita linearia acuminata sessilia 3–6 poll. longa, infra medium 6–9 lin. lata membranacea supra viridia glabra subtus glauca puberula costata venis reliquis gracillimis obscuris. Corymbi 2–3-flori ex axillis verticillati cernui, pedunculis 3–12 lin. pedicellis 3–6 lin. longis. Perianthium 3–5 lin. longum, tubo albo 1½ lin. crasso, dentibus viridibus deltoideis. Antheræ supra medium tubi subsessiles, costis ciliatis. Stylus ovario æquilongus. Bacca globosa 3–4 lin. crassa seminibus 6–10. *Per Europam totam, Caucasum, Himalayæ occidentalis et ori-*

entalis regionem temperatam. P. LEPTOPHYLLUM, *Royle*, est forma angustifolia (foliis interdum haud ultra 1½ lin. latis). CONVALLARIA STELLIFOLIA, *Peterm. Flora*, 1844, no. xxii. 363, ex Carniola, a *verticillato* dicitur recedere foliis ovato-lanceolatis, pedunculis perbrevibus, filamentis longioribus. P. STENOPHYLLUM, *Maxim. Prim. Amur.* 274, ex ditione Amur, vix recedit, nisi baccis minoribus, foliis subtus glabris, costis interioris perianthii haud ciliatis.

23. P. SIBIRICUM, *Red. Lil.* t. 345; *Kunth, Enum.* v. 145.—Convallaria sibirica, *Schult. fil. Syst.* vii. 297.—C. cirrifolia, *Wall. Asiat. Res.* xiii. 382 (cum icone), *Cat.* no. 5136; *D. Don, Prodr. Nep.* 47. —P. cirrifolium, *Royle, Ill. Him.* i. 380; *Kunth, Enum.* v. 145.—P. chinense, *Kunth, Enum.* v. 146. Glaberrimum 2–4-pedale caule flexuoso triente inferiore nudo. Folia permulta ascendentia sessilia linearia 3–6 in verticillos disposita apice spiraliter revoluta 3–5 poll. longa, infra medium 1–9 lin. lata, membranacea firma utrinque glabra supra viridia subtus glauca distincte costata venis crebris gracillimis inæqualibus. Flores 2–4 in corymbos verticillatos dispositi, pedunculis et pedicellis cernuis 3–6 lin. longis. Perianthium 3–4 lin. longum tubo albo 1½ lin. crasso, dentibus oblongo-deltoideis viridibus. Stamina supra medium tubi inserta, filamentis brevissimis ciliatis, antheris ex fauce protrusis. Stylus ovario æquilongus. Bacca globosa 3–4 lin. crassa. *Dahuria, China borealis et regio temperata totius Himalayæ.*

9. HYLONOME, *Webb.*

Webb, Phyt. Can. iii. 320.—Brehnia, *Dietr. Vid. Med. Kiöben.* 1854, 182.—Dictyopsis, *Harv. in Bot. Mag.* t. 5638; *Cape Gen.* edit. 2, p. 406.—Ruscus, sp., *Thunb. &c.*

Perianthium albo-viride oblongum, tubo oblongo, segmentis lanceolatis flore expanso falcatis subæqualibus tubo 2–3plo brevioribus. *Stamina* 6 in tubo inclusa, filamentis filiformibus æqualibus supra basin tubi uniseriatis, antheris oblongis versatilibus apice et basi emarginatis dorsifixis introrsum dehiscentibus. *Ovarium* oblongum sessile triloculare ovulis in loculo paucis superpositis; stylus filiformis; stigma obtuse trilobum. *Bacca* carnosa globosa seminibus paucis turgidis, albumine firmo, testa nitida nigra. *Ab* Rusco *recedit foliis propriis phyllodiis nullis.*

1. H. RETICULATA, *Webb*, loc. cit.—D. Thunbergii, *Harv.* loc. cit.—Ruscus reticulatus, *Thunb. Fl. Cap.* 38; *Kunth, Enum.* v. 276. Suffrutex scandens glaberrima copiose ramosa, ramulis firmis flexuosis divaricatis. Folia sessilia ovata acuminata 2–4 poll. longa rigidula utrinque viridia, venis exsculptis longitudinalibus venulis crebris trans-

versalibus conspicuis connexis. Flores ex axillis foliorum solitarii vel pauci corymbosi. Pedicelli flexuosi 3–6 lin. longi apice articulati. Bracteæ minutæ lanceolatæ scariosæ persistentes. Perianthium 3–4 lin. longum. Bacca globosa 6–9 lin. crassa. *Caput Bonæ Spei,* Thunberg! Burchell 3800! 4554! Zeyher 542, &c.! *Natal,* Cooper 1266! 3256! 3258! Sutherland! &c.

Tribus IV. Tovarieæ.

10. Theropogon, *Maxim.*

Maximowicz, Bull. Acad. Sc. Péters. vii. 330; *Hook. fil. Bot. Mag.* t. 6154.—Ophiopogon, sp., *Wall.*

Perianthium corollinum album 6-partitum caducum diutine campanulatum segmentis lanceolatis æqualibus dorso uninervatis. *Stamina* 6 perianthio duplo breviora, filamentis brevibus applanatis obscure perigynis, antheris oblongo-lanceolatis basifixis introrsum dehiscentibus. *Ovarium* sessile globosum triloculare, ovulis in loculo 10–12 crebris horizontalibus; stylus filiformis ovarium superans; stigma punctiforme. *Bacca* carnosa globosa, seminibus multis crebris subcompressis, albumine corneo, testa fusca.

1. T. pallidus. *Maxim.* loc. cit.—Ophiopogon? pallidus, *Wall. Cat.* no. 5138; *Kunth, Enum.* v. 200. Herba acaulis pedalis vel sesquipedalis habitu *Antherici,* radicibus pilosis. Folia 6–8 graminoidea subpedalia persistentia glabra 2–3 lin. lata distincte costata supra viridia subtus glauca subtiliter nervata. Scapus gracilis firmus foliis brevior. Racemus laxus 10–20-florus, 2–3-pollicaris. Pedicelli solitarii 3–6 lin. longi apice articulati. Perianthium 3–4 lin. longum albidum interdum rubro tinctum segmentis late imbricatis. Bacca magnitudine pisi, siccitate castanea. *Himalayæ centralis et orientalis regio temperata* (*Kumaon, Nepaul, Sikkim, Khasia*), Wallich! Hk. fil. et Thomson! Strachey & Winterbottom! Griffith 5894! V. v. in Hort. Kew.

11. Speirantha, *Baker.*

Albuca, sp., *Hook.*

Perianthium album corollinum 6-partitum segmentis lanceolatis dorso uninervatis flore expanso reflexis. *Stamina* 6 segmentis duplo breviora filamentis hypogynis leviter applanatis, antheris parvis oblongo-lanceolatis versatilibus introrsis longitudinaliter dehiscentibus. *Ovarium* sessile triloculare, ovulis in loculo 3–4 superpositis horizontalibus; stylus filiformis erectus ovario

æquilongus; stigma punctiforme. *Baccam* non vidi. Tab. nostr.

1. S. CONVALLARIOIDES, *Baker*.—Albuca? Gardeni, *Hook. Bot. Mag.* t. 4842. Herba acaulis semipedalis glaberrima habitu omnino *Convallariæ majalis*, rhizomate crasso, stolonibus copiosis. Folia ad rosulam 6–8 suberecta oblanceolata sessilia 5–6 poll. longa supra medium 1–1½ poll. lata acuta firma membranacea utrinque nitide viridia præter apicem costata venis crebris immersis venulis brevissimis obscuris transversalibus. Scapus gracilis 3–4-pollicaris. Racemus subdensus 12–30-florus, 1–2-pollicaris. Pedicelli solitarii ascendentes 3 lin. longi. Bracteæ lanceolatæ scariosæ persistentes pedicellis breviores. Perianthium 2–2½ lin. longum. *In China prope Shanghai*, Baines (non *Natal*, lègit Garden, ut dicitur in Bot. Mag. loc. cit.). (*V. v. in hort. Kew. et Saund.*)

12. MAIANTHEMUM, *Wigg.*

Wigg. Prim. Holst. 15 (1780); *Roth, Fl. Germ.* i. 70; *Kunth, Enum.* v. 147.—Unifolium, *All. Ped.* i. 124.—Sciophylla, *Web. Werth.* 147.—Styranda, *Rafin. Journ. Phys.* 89, 102.—Maia, *Salisb. Gen.* 64.—Convallariæ sp., *Linn.*—Evallaria, sp., *Necker.* —Smilacina, sp., *Desf.*

Perianthium 4-partitum corollinum, segmentis oblongis æqualibus flore expanso reflexis. *Stamina* 4 segmentis vix breviora, filamentis filiformibus hypogynis, antheris minutis oblongis versatilibus introrsis. *Ovarium* sessile globosum biloculare, ovulis in loculo binis collateralibus; stylus filiformis ovario æquilongus; stigma punctiforme. *Bacca* carnosa globosa, seminibus 1–3 turgidis, albumine corneo, testa tenui obscure brunnea. Ab *Tovaria* solum recedit floribus dimeris.

1. M. BIFOLIUM, *DC. Flor. Franc.* iii. 177; *Red. Lil.* t. 216; *Kunth, Enum.* v. 147; *Reich. Ic. Germ.* t. 967.—Convallaria bifolia, *Linn. Sp.* 452; *Flor. Dan.* t. 291; *Bot. Mag.* t. 510.—M. cordifolium, *Moench, Meth.* 638.—M. Convallaria, *Wigg. et Roth* locc. citt.—Convallaria quadrifida, *Lam. Fl. Franç.* iii. 269. Herba erecta 4–8-pollicaris glabra vel puberula rhizomate tenui late reptante. Folia 2 supra medium caulis imposita petiolata cordato-ovata membranacea persistentia 2–3 poll. longa acuta costata venis crebris subæqualibus venulis transversalibus nullis. Racemus 9–18-linearis subdensus 12–30-florus. Pedicelli solitarii vel gemini gracillimi apice articulati. Perianthium ¾–1 lin. longum. Bacca magnitudine pisi rubra. *Per zonam boreali-temperatam ubique disseminatum.* SMILACINA CANADENSIS, *Pursh, Flora*, i. 233; *Nutt. Amer. Gen.* 225 (S. dilatata,

Nuttall, MSS.—S. Eschcholtziana, *Andrz. et Besser.*), est varietas, americana, japonica, et kamschatica, robustior interdum pedalis foliis majoribus sæpe tribus.

13. TOVARIA, *Neck.*

Neck. Elem. iii. 190, no. 1552 (1790), *non Ruiz et Pavon, Prodr.* 85 (1798).—Polygonastrum, *Moench, Meth.* 637 (1794).—Smilacina, *Desf. Ann. Mus. Par.* ix. 51 (1807), excl. sp.; *Endlich. Gen.* no. 1183; *Kunth, Enum.* v. 148.—Asteranthemum, *Kunth, Enum.* v. 151.—Jocaste, *Kunth, Enum.* v. 154.—Medora, *Kunth, Enum.* v. 155.—Neolexis, *Salisb. Gen.* 64.—Convallariæ sp., *Linn.*—Maianthemum, *Link, Enum.* i. 343, ex parte.

Perianthium 6-partitum corollinum marcescens albidum vel raro purpureum, segmentis oblongis flore expanso patulis. *Stamina* 6 inclusa vel raro exserta, filamentis subhypogynis subulatis, antheris oblongis vel globosis versatilibus dorsifixis introrsum longitudinaliter dehiscentibus. *Ovarium* sessile globosum triloculare, ovulis in loculo duobus collateralibus vel superpositis; stylus cylindricus apice stigmatoso obscure tricuspidato. *Bacca* carnosa, seminibus 1–3 turgidis, testa fusca, albumine corneo. *Herbæ rhizomatosæ caulescentes, foliis semper alternis membranaceis oblongis vel lanceolatis sessilibus raro petiolatis costatis crebre verticaliter nervatis venulis brevissimis transversalibus sæpe perspicuis, floribus parvis in racemos vel paniculas terminales dispositis, pedicellis apice articulatis solitariis vel 2–3nis.*

Inflorescentia racemosa. Pedicelli sæpissime solitarii.

Folia pauca	1. *T. trifolia.*	2. *T. oligophylla.*
Folia plurima.		
Americanæ	3. *T. stellata.*	4. *T. sessilifolia.*
Himalayenses	5. *T. pallida.*	6. *T. purpurea.*

Inflorescentia racemosa. Pedicelli inferiores 2–3ni.

Parvifloræ	7. *T. scilloides.*	8. *T. davurica.*
Grandifloræ	9. *T. flexuosa.*	10. *T. Salvini.*

Inflorescentia paniculata.

Stamina perianthio 2–3plo breviora.

Mexicanæ	11. *T. thyrsoidea.*	12. *T. paniculata.*
Himalayenses......	13. *T. fusca.*	14. *T. oleracea.*

Stamina perianthio æquilonga vel paulo breviora.
15. *T. nervulosa.* 16. *T. laxiflora.* 17. *T. japonica.*
Stamina exserta ....18. *T. racemosa.*

1. T. TRIFOLIA, *Neck. Elem.* iii. 190.—Convallaria trifolia, *Linn. Sp.* 452; *Gmel. Siber.* i. 36, t. 6.—Smilacina trifolia, *Desf. Ann. Mus.* ix. 52; *Led. Ross.* iv. 128; *A. Gay, Man.* edit. 5, 530.—Asteranthemum trifoliatum, *Kunth, Enum.* v. 153. Herba 3–6-pollicaris rhizomate gracili longe reptante. Folia 2–4 sæpe 3, ascendentia oblonga acuta 2–4 poll. longa ad basin amplectentem sensim attenuata glabra viridia membranacea costata venis crebris gracillimis venulis paucis transversalibus obviis connexis. Racemus simplex laxus 1–2-pollicaris, 6–15-florus, 6–9 lin. latus. Pedicelli solitarii ascendentes 3–6 lin. longi. Bracteæ minutæ deltoideæ. Perianthium album 1–1½ lin. longum, segmentis oblongo-ligulatis. Filamenta perianthio duplo breviora, antheris minutis globosis demum cæruleis. Stylus ovario æquilongus. Bacca rubra magnitudine pisi. *Siberia orientalis, America borealis a zona arctica ad Wisconsin et Pennsylvaniam.*

2. T. OLIGOPHYLLA, *Baker.* Herba semipedalis vel pedalis rhizomate longe reptante 2–3 lin. crasso caule gracili sursum flexuoso pubescente. Folia 3–5 alterna subpetiolata oblonga 2–3 poll. longa acuta membranacea viridia glabra subtus pallidiora pubescentia costata venis crebris inæqualibus gracilibus venulis transversalibus brevissimis occultis. Racemus 10–20-florus laxus breviter pedunculatus 2–3 poll. longus, expansus 8–9 lin. latus rachi dense pubescente vix flexuosa. Pedicelli solitarii 3–4 lin. longi, ascendentes vel cernui. Bracteæ minutæ deltoideæ persistentes. Perianthium saturate purpureum 2–2½ lin. longum segmentis oblongo-lanceolatis distincte vittatis. Stamina perianthio 2–3plo breviora antheris minutis globosis. Stylus brevissimus. *Sikkim in regione alpina prope Lachen,* 11,000–13,000 *pedes,* Dr. Hooker!

3. T. STELLATA, *Neck. Elem.* iii. 190.—Convallaria stellata, *Linn. Sp.* 452; *Bot. Mag.* t. 1043; *Lodd. Bot. Cab.* t. 1080.—Smilacina stellata, *Desf. Ann. Mus.* ix. 52; *Red. Lil.* t. 185; *A. Gay. Man.* edit. 5, 530.—Asteranthemum vulgare, *Kunth, Enum.* v. 152.—Maianthemum stellatum, *Link, Enum.* i. 343.—Caulis 1–2-pedalis, glaber vel superne puberulus robustus triente inferiore nudo. Folia 6–15 ascendentia oblonga vel lanceolata 2–6 poll. longa acuta vel acuminata sessilia semiamplexicaulia costata venis creberrimis distinctis inæqualibus venulis transversalibus haud obviis supra viridia glabra subtus glauca puberula. Racemus subdensus 10–20-florus brevissime pedunculatus 1–1½ poll. longus, 6–8 lin. latus, pedicellis solitariis erecto-patentibus 1½–3 lin. longis. Bracteæ minutæ deltoideæ. Perianthium album 2–3 lin. longum. Stamina inclusa, antheris flavis minutis. Stylus

½ lin. longus. Bacca nigro-rubra 3–4 lin. crassa. *Norvegia, America borealis occidentalis et orientalis ad Californiam et Virginiam.*

4. T. SESSILIFOLIA, *Baker*.—Smilacina sessilifolia, *Nuttall, MSS.* Caulis 1–2-pedalis triente inferiore nudo superne flexuoso minute puberulo. Folia 9–12 oblongo-lanceolata acuminata 3–6 poll. longa sessilia semiamplexicaulia supra viridia glabra subtus glauca minute puberula costata, venis creberrimis inæqualibus distinctis venulis transversalibus haud obviis. Racemus laxus 6–20-florus sessilis vel breviter pedunculatus 1–2 poll. longus, expansus 10–12 lin. latus rachi flexuosa. Pedicelli solitarii ascendentes 3–6 lin. longi. Bracteæ minutæ lanceolatæ. Perianthium 2–3 lin. longum segmentis lanceolatis. Stamina perianthio subduplo breviora antheris minutis oblongis. Stylus ½ lin. longus. Bacca 3–4 lin. crassa. *America borealis occidentalis a Columbia britannica ad Californiam et Mexicum Novum.*

5. T. PALLIDA, *Baker*.—Smilacina pallida, *Royle, Ill. Him.* i. 380.—S. purpurea albiflora, *Wall. Pl. Asiat. Rar.* ii. 38.—Jocaste purpurea, β. albiflora, *Kunth, Enum.* v. 155. Herba robusta 2–3-pedalis caule sursum flexuoso piloso triente inferiore nudo. Folia 8–12 ascendentia oblonga brevissime petiolata acuta 4–6 poll. longa supra viridia glabra subtus pallidiora pilosa, venis 6–8 validioribus intermediis crebris gracillimis. Racemus 3–6-pollicaris, modice densus, 8–10 lin. latus, rachi subrecta dense pilosa. Pedicelli ascendentes 2–4 lin. longi sæpissime solitarii, raro gemini. Bracteæ minutæ deltoideæ. Perianthium album 2–2½ lin. longum, segmentis oblongis distincte vittatis. Stamina segmentis subtriplo breviora, antheris minutis globosis, filamentis deltoideis. Stylus brevissimus. *Himalayæ centralis regio temperata* (*Simla, Kumaon, Gurwhal,* 8000–11,000 *pedes*), Blinkworth! Thomson! Edgeworth! &c.

6. T. PURPUREA, *Baker*.—Smilacina purpurea, *Wall. Plant. Asiat. Rar.* ii. 38, t. 144; *Cat.* 4201 A.—Jocaste purpurea, *Kunth, Enum.* v. 154. Herba robusta 2–3-pedalis caule sursum pubescente subflexuoso triente inferiore nudo. Folia 5–12 ascendentia distincte brevissime petiolata oblonga 3–6 poll. longa, medio 1–3 poll. lata acuta supra viridia glabra subtus pallidiora venis conspicue ciliatis tenuiter membranacea costata venis 6–8 validioribus reliquis gracillimis venulis transversalibus brevissimis perspicuis. Racemus 3–6-pollicaris modice densus raro basi furcatus, expansus 9–12 lin. latus, rachi dense pubescente vix flexuosa. Pedicelli ascendentes 3–6 lin. longi pubescentes sæpissime solitarii. Bracteæ minutæ deltoideæ. Perianthium 3–4 lin. longum saturate purpureum persistens segmentis oblongis 1–1½ lin. latis. Stamina segmentis triplo breviora, antheris minutis globosis filamentis deltoideis. Stylus brevissimus.

Himalayæ centralis et orientalis regio temperata a Kumaon ad Sikkim, Wallich! Strachey & Winterbottom! Dr. Hooker! &c.

7. T. SCILLOIDES, *Baker.*—Smilacina scilloides, *Mart. et Gal. Enum. Mex.* 17; *Kunth, Enum.* v. 151. Herba glabra 1–1½-pedalis caule flexuoso triente inferiore nudo. Folia 6–8 breviter subpetiolata oblonga acuminata 2–4 poll. longa utrinque viridia glabra venis 2 validioribus reliquis crebris gracillimis venulis transversalibus occultis. Racemus simplex laxus 1–2 poll. longus, 6–12 lin. latus breviter pedunculatus, rachi parum flexuosa. Pedicelli 2–4 lin. longi ascendentes inferiores 2–3ni. Bracteæ minutæ deltoideæ. Perianthium album 1½–2 lin. longum, segmentis oblongis. Stamina perianthio breviora, antheris minutis flavis globosis. Stylus ovario æquilongus. *Mexico,* Galeotti 5471! F. Muller 987! Linden 1287! Gheisbreght 707! S. MACROPHYLLA, *Mart. et Gal. Enum.* 16; *Kunth, Enum.* v. 151, ex descriptione, non potui segregare.

8. T. DAVURICA, *Baker.*—Smilacina davurica, *Turcz. Fl. Baic.* ii. 206; *Led. Ross.* iv. 228.—Asteranthemum dahuricum, *Kunth, Enum.* v. 153. Caulis 1½–3-pedalis superne puberulus triente inferiore nudo. Folia 8–12 oblonga 2–5 poll. longa, subacuta sessilia semiamplexicaulia supra viridia glabra subtus glauca puberula costata venis crebris gracilibus inæqualibus venulis transversalibus occultis. Racemus simplex laxus 10–20-florus, 1–1½-pollicaris, expansus 8–9 lin. latis. Pedicelli gracillimi 3–4 lin. longi puberuli, infimi 2–4ni. Bracteæ minutissimæ. Perianthium 1½–2 lin. longum, album segmentis oblongoligulatis. Stamina segmentis vix breviora, antheris oblongis minutis flavis. Stylus ovario æquilongus. Bacca globosa 3–4 lin. crassa. *Davuria,* Turcznaninow! *In ditione fluminis Amur,* Maximowicz!

9. T. FLEXUOSA, *Baker.*—Smilacina flexuosa, *Bertol. Fl. Guat.* 11, t. 4; *Hook. Ic.* t. 529; *Kunth, Enum.* v. 150.—S. Bertolonii, *Kunth, Enum.* v. 151. Glabra caule 1½–2-pedali subrecto. Folia 10–12 breviter subpetiolata oblonga vel lanceolata 2–5 poll. longa cuspidata vel acuta membranacea utrinque glabra viridia venis 4–6 validioribus reliquis gracillimis venulis multis distinctis transversalibus connexis. Racemus simplex lanceolatus 2–3-pollicaris, expansus 18–21 lin. latus, rachi insigniter flexuosa. Pedicelli ascendentes 3–6 lin. longi, inferiores 3–4ni. Bracteæ minutæ deltoideæ. Perianthium albidum 4 lin. longum, segmentis oblanceolatis obtusiusculis. Stamina perianthio subduplo breviora, antheris minutis flavis. Stylus ovarium duplo superans. Bacca magnitudine pisi. *Guatemala,* Skinner!

10. T. SALVINI, *Baker.* Herba glabra 1–2-pedalis caule subrecto. Folia 7 subsessilia oblanceolata acuminata 3–4 poll. longa membranacea venis 4–6 validioribus, intermediis crebris, venulis trans-

versalibus nullis. Racemus simplex densus semipedalis breviter pedunculatus deorsum 15–16 lin. latus, rachi valde sulcata parum flexuosa. Pedicelli inferiores 2–4ni deflexi, 6–9 lin. longi. Bracteæ obsoletæ. Perianthium 3 lin. longum sordide purpureum, segmentis oblanceolato-oblongis obtusis. Stamina perianthio duplo breviora, antheris lacteis sagittatis filamentis duplo brevioribus. Stylus 1 lin. longus. *Guatemala ad montem Volcan de Atitlan, ad* 9000 *pedes,* Salvin!

11. T. THYRSOIDEA, *Baker.* Herba glaberrima 2–4-pedalis caule superne flexuoso triente inferiore nudo. Folia 10–15 distincte petiolata oblonga acuminata 3–8 poll. longa utrinque viridia glabra venis 4–6 validioribus reliquis crebris gracillimis venulis transversalibus brevissimis occultis. Panicula thyrsoidea 3–6-pollicaris rachi angulata sulcata vix flexuosa ramis multis parallelis ascendentibus, inferioribus 3–4 poll. longis superioribus sensim brevioribus. Pedicelli solitarii 2–4 lin. longi. Bracteæ subnullæ. Perianthium album 1½ lin. longum segmentis oblongis. Stamina perianthio duplo breviora, antheris oblongis flavis, filamentis subulatis. Stylus ½ lin. longus. *Mexico,* Jurgensen 773! 959! Brotero 914! Botteri 138! F. Muller 985!

12. T. PANICULATA, *Baker.* Smilacina paniculata, *Mart. et Gal. Enum. Mex.* 17; *Kunth, Enum.* v. 151. Herba glabra 1½–2-pedalis caule parum flexuoso triente inferiore nudo. Folia 7–9 distincte subpetiolata oblonga acuminata 4–6 poll. longa utrinque glabra viridia venis 6 validioribus reliquis crebris gracillimis, veniolis transversalibus brevissimis occultis. Panicula oblonga vel deltoidea 3–4 poll. longa, 2 poll. lata subdensa rachi vix flexuosa sessilis vel breviter pedunculata, ramis ascendentibus corymbosis. Pedicelli solitarii 3–9 lin. longi, bracteis subnullis. Perianthium album 2 lin. longum, segmentis oblongis obtusis. Stamina perianthio subduplo breviora, antheris minutis globosis flavis filamentis subulatis. Stylus ovario æquilongus. *Mexico,* Galeotti, Gheisbreght, 708! *Guatemala,* Skinner! SMILACINA AMŒNA, *Wendl. in Otto et Dietr. Allg. Gartenzeit.* xviii. 137, *Walp. Ann.* iii. 645, ex descriptione, non potui segregare.

13. T. FUSCA, *Baker.* Smilacina fusca, *Wall. Pl. Asiat. Rar.* iii. 37, t. 257.—S. divaricata, *Wall. Cat.* no. 4202.—S. bootanensis, *Griff. Ic.* 279, *Itin.* 178.—Medora divaricata, *Kunth, Enum.* v. 156. Herba subglabra 1–2-pedalis caule gracili valde flexuoso dimidio inferiore nudo. Folia 4–6, petiolis canaliculatis 6–15 lin. longis prædita, cordato-ovata 3–6 poll. longa cuspidata vel acuminata membranacea utrinque glabra vel parce setulosa viridia venis 4–6 validioribus reliquis crebris gracillimis venulis transversalibus haud obviis. Panicula deltoidea 3–6-pollicaris breviter pedunculata rachi

primaria et ramis ascendentibus vel divaricatis laxifloris insigniter flexuosis. Pedicelli solitarii 3–6 lin. longi. Bracteæ minutissimæ deltoideæ. Perianthium 1 lin. longum fusco-purpureum, segmentis oblanceolatis obtusis interioribus sensim minoribus. Stamina perianthio triplo breviora, antheris minutis flavis globosis. Stylus brevissimus. Bacca magnitudine pisi 1–3-sperma. *Himalayæ orientalis regio temperata* (*Nepaul, Sikkim, Khasia, Bhotan*), Wallich! Dr. Hooker! Griffith 5852!

14. T. OLERACEA, *Baker.*—Smilacina oleracea, *Hook. fil. & Thom. Herb. Ind.* Herba robusta edulis 2–5-pedalis caule sursum flexuoso dense piloso triente inferiore nudo. Folia 10–14 oblonga vel oblongo-lanceolata 3–8 poll. longa acuminata brevissime petiolata supra viridia glabra subtus pallidiora pilosa, venis 6–8 multo validioribus, reliquis crebris gracillimis venulis transversalibus occultis. Panicula oblonga vel deltoidea 3–12-pollicaris, expansa 4–6 poll. lata, rachi primaria et ramis ascendentibus pilosis valde flexuosis. Pedicelli solitarii 3–4 lin. longi recti vel arcuati. Perianthium albidum 3–4 lin. longum, segmentis obtusis distincte vittatis $1\frac{1}{2}$–2 lin. longis. Stamina segmentis triplo breviora, antheris flavis globosis minutis, filamentis deltoideis. Stylus brevissimus, apice breviter tricuspidatus. Bacca magnitudine pisi. *Sikkim regio temperata,* 9000–11000 *pedes,* Dr. Hooker! Icon Cathcart. inedit.! Griffith 5853! "Chokli-bi" incolarum.

15. T. NERVULOSA, *Baker.* Herba gracilis glaberrima vix pedalis. Folia 5–6 distincte petiolata oblongo-lanceolata acuminata 3–4 poll. longa utrinque viridia glabra venis 2 validioribus, reliquis perspicuis, venulis multis transversalibus siccitate perspicuis, connexis. Panicula oblonga laxa $1\frac{1}{2}$-pollicaris, rachi haud flexuosa, ramis paucis divaricatis paucifloris racemosis. Pedicelli solitarii $\frac{1}{2}$–$1\frac{1}{2}$ lin. longi. Bracteæ subnullæ. Perianthium 1 lin. longum, album, segmentis oblongis obtusis reflexis. Stamina perianthio paulo breviora, antheris flavis globosis filamento subulato subduplo brevioribus. Stylus brevissimus. *Mexico ad Jalapa,* Herb. Bentham.!

16. T. LAXIFLORA, *Baker.* Herba glaberrima caule gracili superne vix flexuoso triente inferiore nudo. Folia 6–9 oblongo-lanceolata acuminata 3–4 poll. longa distincte petiolata reliquis firmiora utrinque viridia glabra nitidula venis 2 validioribus, intermediis crebris distinctis, venulis transversalibus siccitate perspicuis. Panicula laxissima deltoidea 3-pollicaris sessilis vel breviter pedunculata rachi pallida haud flexuosa ramis paucifloris ascendentibus. Pedicelli solitarii 3–6 lin. longi. Bracteæ subnullæ. Perianthium album 2 lin. longum, segmentis oblongis obtusis. Stamina perianthio æquilonga, antheris oblongis pallide luteis filamento subulato qua-

druplo brevioribus. Stylus ovario æquilongus. *Guatemala ad Chilasco*, Salvin et Godman!

17. T. JAPONICA, *Baker*.—Smilacina japonica, *A. Gray, Bot. Parr. Exp.* 321; *Bot. Jap.* 414; *Miquel Ann. Mus. Lug.-Bat.* iii. 149.—S. hirta, *Maxim. Prim. Amur.* 276. Caulis $1\frac{1}{2}$–2-pedalis, dimidio inferiore nudo, superiore flexuoso dense piloso. Folia 5–7 ascendentia subpetiolata late oblonga 3–5 poll. longa cuspidata supra viridia glabra subtus pallidiora pilosa, venis 6–8 validioribus, reliquis crebris gracilibus, venulis transversalibus brevissimis obviis. Panicula oblonga distincte pedunculata 2–3 poll. longa, rachi dense pilosa parum flexuosa, ramis multis ascendentibus parum flexuosis. Pedicelli solitarii brevissimi. Bracteæ minutissimæ. Perianthium $1\frac{1}{2}$ lin. longum album segmentis ligulatis. Stamina segmentis paulo breviora, antheris minutis flavis globosis. Stylus $\frac{1}{2}$ lin. longus. Bacca magnitudine pisi. *Japonia*, J. Small! Hodgson! *Siberia orientalis*, Maximowicz!

18. T. RACEMOSA, *Neck. Elem.* iii. 190.—Convallaria racemosa, *Linn. Sp.* 452; *Bot. Mag.* t. 899.—Maianthemum racemosum, *Link, Enum.* i. 343.—Polygonastrum racemosum, *Moench, Meth.* 637.—Smilacina racemosa, *Desf. Ann. Mus. Par.* ix. 51; *Red. Lil.* t. 230; *Torrey, New York*, t. 130. Herba robusta 2–3-pedalis caule vix flexuoso glabro vel superne piloso triente inferiore nudo. Folia 10–15 ascendentia oblonga vel lanceolata acuminata brevissime petiolata 3–9 poll. longa supra viridia glabra subtus pallidiora puberula, venis crebris inæqualibus, venulis transversalibus brevissimis occultis. Panicula oblonga vel deltoidea breviter pedunculata 2–6 poll. longa, rachi recta pilosa, ramis densifloris ascendentibus. Pedicelli solitarii $\frac{1}{4}$–1 lin. longi. Bracteæ deltoideæ minutissimæ. Perianthium albidum 1 lin. longum segmentis ligulatis. Stamina distincte exserta, antheris minutis globosis flavis. Stylus ovario æquilongus. Bacca pallide rubra purpureo punctata sæpe monosperma aromatica magnitudine pisi. *Columbia britannica ad Californiam, Novum Mexicum et Missouri ad Virginiam*.—S. CILIATA, *Desf. Ann. Mus.* ix. 53, t. 9; *Kunth, Enum.* v. 150, est forma parva panicula conferta.—S. AMPLEXICAULIS, *Nutt. Journ. Acad. Phil.* vii. 58; *S. Wats. Bot.* 40 *Parall.* 345, et S. LATIFOLIA, *Nuttall, MSS.*, sunt formæ occidentales foliis latioribus basi vix pseudo-petiolatis apice cuspidatis.

Species mihi ignota.

SMILACINA FORSKALIANA, *Schult. fil. Syst.* vii. 304 = Convallaria racemosa, *Forsk. Flor. Ægypt. Arab.* 73.

14. Drymophila, *R. Br.*

R. Br. Prod. 292; *Endlich. Gen.* no. 1178; *Kunth, Enum.* iv. 211; *Hook. fil. Fl. Tasm.* ii. 48.

Perianthium corallinum albidum 6-partitum segmentis lanceolatis æqualibus multinervatis flore expanso reflexis. *Stamina* 6 hypogyna perianthio duplo breviora, filamentis filiformibus, antheris oblongis versatilibus introrsis longitudinaliter dehiscentibus. *Ovarium* oblongum sessile triloculare ovulis in loculo pluribus; styli 3 liberi falcati. *Bacca* globosa seminibus pluribus turgidis, testa nitida castanea, albumine corneo. *Suffrutices parvi caulibus simplicibus vel ramosis, foliis sessilibus firmis persistentibus alternis basi tortis, floribus parvis in axillis foliorum solitariis cernuis, pedicellis apice articulatis.* Ab Asparageis reliquis, *Medeola* excepta, recedit stylis more *Colchici* solutis.

Semina parva plurima .... 1. *D. cyanocarpa.*
Semina magna pauca .... 2. *D. Moorei.*

1. **D. cyanocarpa,** ***R. Br. Prod.*** **292;** ***Kunth, Enum.*** **iv. 212;** ***Hook. fil. Fl. Tasm.*** **ii. 48;** ***F. Muell. Frag.*** **vii. 73. Suffrutex glaber 1–2-pedalis triente vel quadrante superiore foliato et sæpe ramoso, ramis divaricatis. Folia lanceolata acuminata 1–3 poll. longa firma viridia costata venis gracilibus inæqualibus venulis transversalibus haud perspicuis. Pedicelli 3–6 lin. longi. Perianthium 3–4 lin. longum. Genitalia omnia perianthio duplo breviora. Bacca speciosa cærulea 3–4 lin. crassa, seminibus sæpe 8–12.** ***Tasmania, Australia orientalis meridionalis.***

2. **D. Moorei,** ***Baker.*** **Suffrutex pedalis caule firmo acute lineato simplici parum flexuoso triente superiore foliato. Folia regulariter alterna oblonga vel lanceolata 1½–2 poll. longa, medio 8–12 lin. lata, subcoriacea utrinque nitidula pallide viridia venis 12–18 venulis multis transversalibus perspicuis connexis. Pedicelli 4–6 lin. longi floriferi cernui fructiferi ascendentes. Perianthium albidum 3 lin. longum. Pistillum perianthio vix brevius ovario anguste ampullæformi stylis falcatis ovario triplo brevioribus. Bacca oblonga 6–8 lin. longa, seminibus paucis quadruplo majoribus quam in** ***D. cyanocarpa*** **testa pallidiore.** ***Australia orientalis ad ripas fluminis Hastings,*** **C. Moore!**

15. Geitonoplesium, *A. Cunn.*

A. Cunn. Bot. Mag. t. 3131; *Endlich. Gen.* no. 1163; *Kunth, Enum.* v. 112.—Luzuriaga, *R. Br. Prod. Austr.* 282, *non R. & P.*

Perianthium corollinum 6-partitum caducum, segmentis oblongis æqualibus multinervatis exterioribus firmioribus ante anthesin valvatis interioribus haud fimbriatis. *Stamina* 6 hypogyna inclusa, filamentis filiformibus antheris elongatis ligulatis introrsum longitudinaliter dehiscentibus brevioribus. *Ovarium* sessile triloculare, ovulis in loculo 6–8; stylus filiformis apice stigmatoso integro. *Bacca* globosa, seminibus paucis turgidis, testa nigra, albumine corneo.

1. G. CYMOSUM, *A. Cunn. loc. cit.*; *Kunth, loc. cit.*; *F. Muell. Frag.* vii. 74; *Seem. Fl. Viti.* 312.—Luzuriaga cymosa, *R. Br. Prodr.* 282; *Bauer, Ill. Plant. Norfolk*, t. 129.—G. montanum, *Kunth, Enum.* v. 113.—Luzuriaga montana, *R. Br. Prodr.* 282.—G. asperum, *A. Cunn. Bot. Mag. sub* t. 3131. Suffrutex ramosissimus glaber volubilis ramulis divaricatis. Folia lanceolata facile caduca subpetiolata 2–4 poll. longa rigide subcoriacea utrinque viridia obscure vel distincte costata crebre verticaliter striata. Flores ad apices ramulorum pauci laxe corymbosi, pedicellis ascendentibus 3–6 lin. longis apice articulatis, bracteis minutis deltoideis. Perianthium purpureo-viridulum 3–4 lin. longum. Genitalia perianthio paulo breviora. Antheræ flavæ 2 lin. longæ. Bacca nigra magnitudine cerasi. *Australia a Gippsland ad Queensland, insulæ Howe, Pinorum, et Norfolk, Nova Caledonia, Viti.*—G. ANGUSTIFOLIUM, *K. Koch in Walp.* Ann. v. 143 (Medeola, *Red. Lil.* t. 393), est forma foliis linearibus 1½–2 lin. latis.

Species exclusæ.

G. SCANDENS et G. HUMILE, *Hassk. Cat. Bogor.* 31; *Kunth, Enum.* v. 113, sunt *Asparagi* species imperfecte descriptæ.

16. EUSTREPHUS, *R. Br.*

R. Br. Prodr. 281; *Endlich. Gen.* no. 1162; *Kunth, Enum.* v. 110.—Luzuriagæ sp., *Poiret.*

Perianthium corollinum 6-partitum, segmentis oblongis multinervatis, exterioribus firmioribus ante anthesin valvatis, interioribus more *Thysanoti* fimbriatis. *Stamina* 6 hypogyna inclusa, filamentis brevibus applanatis, antheris oblongis acutis introrsis longitudinaliter dehiscentibus dorso prope basin affixis. *Ovarium* sessile ovoideum triloculare, ovulis in loculo pluribus; stylus filiformis apice stigmatoso integro. *Bacca* globosa interdum vetustate trivalvis seminibus pluribus turgidis strophiolatis, testa atra, albumine corneo.

1. E. LATIFOLIUS, *R. Br. Brod.* 281; *Ait. Kew. edit.* 2, ii. 273; *Bot.*

Mag. t. 1245; *Kunth, Enum.* v. 111.—E. Brownii, var. latifolius, *F. Muell. Fragm.* vii. 71. Suffrutex glaber ramosissimus ramulis firmis gracillimis. Folia alterna lanceolata 2–3 poll. longa, medio 6–9 lin. lata subpetiolata rigide coriacea persistentia distincte costata crebre inæqualiter distincte nervata. Flores in umbellas multas sessiles 4–10-floras in axillis foliorum dispositi, pedicellis 6–12 lin. longis medio articulatis, bracteis minutis. Perianthium lilacinum 3–4 lin. longum. Antheræ flavæ $1\frac{1}{2}$ lin. longæ. Bacca flava 6–9 lin. crassa. *Australia in sylvis cum* Geitonoplesio *ab Gippsland ad Queensland.* E. ANGUSTIFOLIUS, *R. Brown et Kunth, loc. cit.* (E. Brownii, var. angustifolius, *F. Muell.*) est varietas foliis linearibus $1\frac{1}{2}$–3 lin. latis.—E. WATSONIANUS, *Miquel in Linnæa,* 1844, 84, est forma inter *latifolium* et *angustifolium* medium tenens.—E. LEUCANTHUS, *Hassk. Pl. Jav. Rar.* 115, est verisimiliter forma altera ejusdem speciei.

Tribus V. DIANELLEÆ.

17. LUZURIAGA, *R. & P.*

Ruiz et Pav. Fl. Peruv. iii. 66, t. 293; *Schult. fil. Syst.* vii. 26; *Endlich. Gen.* no. 1186; *Kunth, Enum.* v. 278.

Perianthium corollinum album 6-partitum, late campanulatum, caducum, segmentis oblongis vel lanceolatis æqualibus imbricatis multinervatis. *Stamina* 6 inclusa æqualia, filamentis hypogynis subulatis basi applanatis antheris linearibus bilocularibus basifixis poris apicalibus vel basalibus dehiscentibus. *Ovarium* sessile ovoideum, ovulis in loculo 5–6; stylus filiformis, apice stigmatoso punctiformi. *Bacca* carnosa, seminibus paucis turgidis, testa pallida, membranacea, albumine corneo. *Suffrutices ramosissimi ad truncos arborum sæpe scandentes, ramis patulis acute angulatis, foliis parvis alternis oblongis subcoriaceis sessilibus, floribus ex axillis foliorum multorum* 1–4*nis pedicellatis glanduloso-punctatis, pedicellis medio articulatis.*

Antheræ erectæ filamenta triplo superantes ...... 1. *L. radicans.*
Antheræ deflexæ filamentis breviores .... 2. *L. erecta.*

1. L. RADICANS, *R. & P. loc. cit.*; *Kunth, Enum.* v. 279. Suffrutex decumbens interdum subscandens copiose ramosus ramulis foliatis firmis acute angulatis. Folia alterna oblonga sessilia 1–$2\frac{1}{2}$ poll. longa subcoriacea supra pallide viridia subtus glauca, mucronata, torsione basi verticalia, venis multis distinctis verticalibus, venulis brevibus horizontalibus perspicuis connexis. Flores ex axillis foliorum 1–4, pedicellis ascendentibus 9–12 lin. longis, infra medium articulatis,

basi bracteis scariosis brunneis involucratis. Perianthium 6–8 lin. longum, segmentis medio 2–2½ lin. latis punctis crebris rubro-brunneis decoratis. Antheræ erectæ 2½–3 lin. longæ, glanduloso-punctatæ filamenta triplo superantes, poris apicalibus dehiscentibus. Bacca magnitudine pisi. *Chili et Peruvia.*

2. L. ERECTA, *Kunth, Enum.* v. 280.—Callixene polyphylla, *Hook. Ic.* t. 674 ; *Bot. Mag.* t. 5192 ; *Hook. fil. Fl. Antarc.* ii. 355. Suffrutex subscandens copiose ramosus, ramulis foliatis firmis acute angulatis. Folia alterna oblonga 6–12 lin. longa torsione basi verticalia rigidula supra viridia subtus glauca, venis verticalibus 6–12 venulis horizontalibus perspicuis connexis. Flores ex axillis foliorum solitarii, pedicellis ascendentibus 6–9 lin. longis, infra medium articulatis, basi bracteis scariosis castaneis suffultis. Perianthium 5–6 lin. longum, sæpissime rubro-brunneo punctatum, segmentis oblongis acutis. Filamenta lineari-subulata, perianthio 2–3plo breviora, antheris 1½ lin. longis arcte reflexis, poris basalibus dehiscentibus. Stylus 2 lin. longus. Bacca 5–6 lin. crassa. *Chili meridionalis ad truncos arborum.*

18. DIANELLA, *Lam.*

Encyc. ii. 276 ; *R. Br. Prodr.* 279 ; *Schult. Syst.* vii. xxviii et 349 ; *Endl. Gen.* No. 1160 ; *Kunth, Enum.* v. 43.—Rhuacophila, *Blume, Enum. Jav.* i. 13 ; *Endlich. Gen.* No. 1161.—Dracænæ sp., *Linn. et Thunb.*

Perianthium 6-partitum marcescens saturate cæruleum vel albidum, segmentis oblongis, exterioribus sæpe angustioribus, flore expanso reflexis, late imbricatis, laxe vel confertim 3–5-nervatis. *Stamina* 6 hypogyna inclusa, filamentis brevibus apice geniculatis, struma oblonga flava præditis, antheris basifixis obliquis linearibus poris apicalibus dehiscentibus. *Ovarium* globosum sessile triloculare, ovulis in loculo crebris horizontalibus ; stylus filiformis rectus vel leviter geniculatus ovarium 2–3plo superans, apice stigmatoso integro capitato. *Bacca* globosa cærulea, seminibus crebris turgidis, testa nitida atra, albumine carnoso. *Herbæ vel suffrutices erectæ glaberrimæ, radicibus fibrosis sæpe stoloniferis, foliis distichis distantibus vel in rosulam basalem plerisque confertis linearibus duris persistentibus, floribus copiosis laxe paniculatis, pedicellis apice articulatis, baccis speciosis nitidis cæruleis.*

Antheræ 1 lin. longæ.
Suffrutex ramosa .... 1. *D. austro-caledonica.*
Herbæ acaules...... 2. *D. tasmanica.* 3. *D. Hookeri.*
Antheræ $1\frac{1}{2}$ lin. longæ.
Caulescentes.
Flores in glomerulos globosos congesti. 4. *D. congesta.*
Inflorescentia laxe paniculata.
5. *D. cærulea.* 6. *D. ensifolia.*
Acaules.
Perianthii segmenta exteriora laxe nervata.
7. *D. rara.* 8. *D. lævis.*
Venæ segmentorum in carinam centralem confertæ.
9. *D. intermedia.* 10. *D. revoluta.* 11. *D. divaricata.*

1. D. AUSTRO-CALEDONICA, ***Seem. Fl. Vit.*** **312. Suffrutex ramosus, foliis ad ramos distichis distantibus ascendentibus 5–8 poll. longis, 4–8 lin. latis, subtus glaucis, basi caulem breviter vaginantibus, carina et marginibus lævibus. Paniculæ laxæ obverse deltoideæ 4–6 poll. latæ ad folia contiguæ, ramis gracilibus ascendentibus, infimis foliis 3–4 poll. longis bracteatis, ramulis ultimis corymbosis paucifloris, pedicellis ascendentibus 6–12 lin. longis. Bracteæ ultimæ minutæ lineares. Perianthium cæruleum 4 lin. longum, segmentis omnibus laxe 5-nervatis. Antheræ lineares 1 lin. longæ, struma vix longiores, filamento duplo breviores.** ***Insula Pinorum in locis paludosis,*** **Macgillivray 780! Milne!** ***Nova-Caledonia,*** **Forster.**

2. D. TASMANICA, ***Hk. fil. Fl. Tasm.*** **ii. 57, tab. 133 A;** ***Bot. Mag.*** **t. 5551;** ***F. Mull. Frag.*** **vi. 121. Herba acaulis 4–5-pedalis, foliis plerisque in rosulam basalem disticham aggregatis 2–4-pedalibus, 9–12 lin. latis, vagina semipedali marginibus asperis rubro-brunneis. Folia caulina pauca reducta. Panicula laxissima 1–2-pedalis folia superans, ramis eis** ***cæruleæ*** **magis compositis et patulis, ultimis subcorymbosis, pedicellis cernuis 6–9 lin. longis. Bracteæ lineari-subulatæ. Perianthium cæruleum 4–4½ lin. longum segmentis flore expanso reflexis omnibus medio subdense 5-nervatis. Filamenta geniculata struma breviora. Struma oblanceolato-oblonga 1 lin. longa, aurantiaca. Anthera lanceolata citrina struma paulo brevior. Ovarium viride, stylo cæruleo 2 lin. longo.** ***Tasmania et Australia meridionalis.*** **D. ARCHERI,** ***Hook. fil. Fl. Tasm.*** **ii. p. 58, t. 133 B, est varietas vel species affinis perianthii segmentis latioribus, filamentis alternis infra strumam ad perianthium adnatis. D. DENSA,** ***Lindb. Pl. Hort. Bot. Helsing.*** **132, t. 6, non potui segregare.**

3. D. HOOKERI, ***Baker*****—D. lævis,** ***Hook. fil. Fl. Tasm.*** **ii. 57,** ***non R. Br.***

Herba acaulis bipedalis foliis plerisque in rosulas dense distichas basales confertis 1–2-pedalibus, 6–9 lin. latis vaginis 4–6-pollicaribus saturate viridibus purpureo-tinctis marginibus glabris. Folia caulina pauca reducta. Panicula pedalis et ultra, e foliis haud eminens, ramis infimis distantibus, centralibus patulis 3–4 lin. longis, ultimis corymbosis, pedicellis cernuis 3–6 lin. longis. Perianthium cæruleum 4 lin. longum, segmentis flore expanso reflexis, venis 5 in carinam congestis. Stamina perianthio triente breviora. Struma aurantiaca oblonga 1 lin. longa antheram oblongam superans. Filamenta vix geniculata. *Tasmania.* (*V. v. in hort. Kew.*)

4. D. CONGESTA, *R. Br. Prod.* 280; *Kunth, Enum.* v. 54. Herba caulescens bipedalis caule simplici ad basin paniculæ distiche foliato, foliis pedalibus 6–7 lin. latis, marginibus lævibus basi longe vaginantibus. Flores in glomerulos 3–4 congestos dispositi, superiores sessiles, inferiores breviter pedunculatos, foliis 3–4 poll. longis bracteatos. Pedicelli 2–3 lin. longi. Bracteæ 1½–2 lin. longæ membranaceæ arcte imbricatæ. Perianthium immaturum solum vidi. *Australia tropicalis ad fretum Torres,* R. Brown ! Ab reliquis omnibus inflorescentia longe distat.

5. D. CÆRULEA, *Sims, Bot. Mag.* t. 505; *Red. Lil.* t. 79; *R. Br. Prodr.* 279; *Lindl. Bot. Reg.* t. 1120; *Kunth, Enum.* v. 44; *F. Muell. Fragm.* vi. 123. Herba suffruticosa vetustate caulescens ramosa foliis circiter 6 ad apices ramorum fasciculatis distichis 9–12 poll. longis basi vaginantibus 6–9 lin. latis, saturate viridibus dorso et marginibus asperis. Folia supra rosulas basales pauca distantia. Panicula pedalis et ultra, ramis gracilibus brevibus infimis foliis valde reductis bracteatis, ultimis corymbosis, pedicellis cernuis 3–6 lin. longis. Bracteæ ultimæ minutæ. Perianthium 3–4 lin. longum, segmentis exterioribus laxe 5-nervatis, interioribus confertim 3-nervatis. Stamina perianthio paulo breviora, antheris luteo-viridulis lanceolatis 2 lin. longis, struma aurantiaca oblonga 1 lin. longa, filamento brevissimo. Stylus filiformis ovarium quadruplo superans. *Australia temperata orientalis,* Sieber 199 ! &c. D. GRAMINIFOLIA, *Kunth, Enum.* v. 46 (D. cærulea, *Hk. fl. Tasm.* ii. 56, D. elegans, *F. M. Frag.* vi. 122), est verisimiliter varietas angustifolia acaulis Tasmanica hujus speciei floribus minoribus; et D. ANGUSTIFOLIA, *Schult. Syst.* vii. 352; *Kunth, Enum.* v. 47, forma parva reducta floribus paucis foliis 2 lin. latis. D. ELEGANS, *Kunth, Enum.* v. 49, mihi ignota, ex descriptione est planta caulescens Tasmanica venis segmentorum more *D. ensifoliæ* in carinam centralem concretis.

6. D. ENSIFOLIA, *Red. Lil.* t. 1; *Gawl. Bot. Mag.* t. 1404; *Kunth, Enum.* v. 50.—Dracæna ensifolia, *Linn. Mant.* 63; *Ait. Kew.* i. 454. —Dianella nemorosa, *Lam. Encyc.* ii. 276; *Jacq. Schoen.* i. 49, t. 94.

—D. odorata, *Blume, Enum.* i. 13; *Kunth, Enum.* v. 51.—D. sandwicensis, *Hook. et Arn. Bot. Beech.* iii. 97.—D. javanica, *Kunth, Enum.* v. 52.—Rhuacophila javanica, *Blume, Enum.* i. 14.—Dracæna ensata, *Thunb. et Dallm. Diss.* 3!—Anthericum Adenanthera, *Forst. Prodr.* no. 149!—Phalangium Adenanthera, *Poir. Ency.* v. 252. Herba caulescens 3–6-pedalis foliis nunquam rosulatis. Folia multa dura alterna ascendentia linearia persistentia, inferiora 1–2-pedalia, 9–12 raro 18 lin. lata, carina et marginibus lævibus, basibus caulem longe amplectentibus. Panicula laxa obversa deltoidea 1–1½-pedalis, ramis paucis ascendentibus foliis valde reductis bracteatis, ultimis racemoso-corymbosis pedicellis cernuis 3–9 lin. longis. Bracteæ minutæ lineares. Perianthium 3–4 lin. longum, cæruleum vel albidum, venis verticalibus segmentorum omnium 5 in carinam haud congestis. Antheræ lineares 1½–2 lin. longæ, struma 4plo, filamento duplo, longiores. Bacca cærulea magnitudine pisi, seminibus in loculo crebris turgidis nitidis. *Insulæ Mascarenenses, Asia tropicalis* (*Himalayæ orientalis regio tropicalis, peninsula et insulæ Malaccanæ, China meridionalis, insulæ Loo-Choo et Formosa*), *Nova Caledonia, Australia tropicalis, Insulæ Sandvicenses.* D. MONTANA, *Blume* (*Enum.* i. 12; *Kunth, Enum.* v. 54), est varietas ramis ultimis paniculæ dense reguriter racemosis pedicellis ascendentibus 3–4 lin. longis.

7. D. RARA, *R. Br. Prod.* 280; *Kunth, Enum.* v. 54. Herba acaulis 2–3-pedalis foliis plerisque in rosulam basalem aggregatis semipedalibus 1 lin. latis dorso et marginibus lævibus. Folia caulina pauca reducta. Panicula laxissima 6–9 poll. longa et lata, ramis ultimis racemosis paucifloris subsecundis, pedicellis cernuis 6–9 lin. longis. Bracteæ minutissimæ lineari-subulatæ. Perianthium 3 lin. longum, segmentis exterioribus laxe 5-nervatis, interioribus dense trinervatis. Antheræ 1½ lin. longæ, strumam multo superantes. *Australia tropicalis ad Shoal Bay*, R. Brown!

8. D. LÆVIS, *R. Br. Prodr.* 280; *Kunth, Enum.* v. 54.—D. longifolia, *R. Br. et Kunth, loc. cit.*; *F. Muell. Frag.* vi. 122, *excl. syn.*; *Charsley, Wild Flowers*, t. 13.—D. strumosa, *Lindl. Bot. Reg.* t. 751; *Lodd. Bot. Cab.* t. 1136; *Kunth, Enum.* v. 45. Herba acaulis 3–4-pedalis, foliis plerisque prope basin caulis impositis 1–1½-pedalibus, 6–9 lin. latis, dorso et marginibus lævibus, eis *cæruleæ* minus coriaceis pallidioribus primum leviter glaucis. Panicula deltoidea pedalis et ultra, ramis magis compositis quam in speciebus reliquis, ultimis paucifloris racemoso-corymbosis, pedicellis cernuis 6–9 lin. longis. Bracteæ majores quam in speciebus alteris. Perianthium 4–4½ lin. longum segmentis exterioribus distanter 5-nervatis, interioribus in triente centrali dense trinervatis. Antheræ lanceolatæ flavo-viridulæ, 1½ lin. longæ. Struma aurantiaca anthera duplo brevior. *Australia*

temperata orientalis, R. Brown! Robertson! Riley! &c. D. LONGIFOLIA, *R. Br.*! est forma foliis tripedalibus (*v. v. in hort. Kew.*).

9. D. INTERMEDIA, *Endlich. Prod. Fl. Ins. Norf.* 28; *Bauer, Ill.* t. 178; *Hk. fil. Flor. New Zeal.* i. 255; *Kunth, Enum.* v. 53; *Seem. Fl. Vit.* 312, *excl. syn.*—Anthericum ensatum, *Banks & Soland. MSS. cum icone.* Herba erecta 2–3-pedalis foliis plerisque in rosulam basalem aggregatis 1–2 ped. longis, 4–8 lin. latis basi longe vaginantibus carina et marginibus asperis. Folia caulina pauca distantia reducta. Panicula laxa, pedalis et ultra, ramis infimis foliis valde reductis bracteatis, ramulis ultimis paucifloris corymbosis, pedicellis cernuis 6–9 lin. longis. Bracteæ ultimæ minutæ lineari-subulatæ. Perianthium pallide cæruleum 2 lin. longum, nervis segmentorum in carinam centralem concretis. Antheræ lanceolatæ ¾ lin. longæ, filamentum cum struma parva superantes. *Nova Zealandia, et insulæ Norfolk, Feejeenses, et Societatum.*

10. D. REVOLUTA, *R. Br. Prodr.* 280; *Lindl. Bot. Reg.* 1120; *Kunth, Enum.* v. 48; *Hook. fil. Fl. Tasm.* ii. 57; *F. Muell. Fragm.* vi. 121; *Charsley, Wild Flowers*, t. 12.—D. divaricata, *Kunth, Enum.* v. 47, *non R. Br.*—D. longifolia, *Lindl. Bot. Reg.* t. 734; *Hook. fil. Fl. Tasm.* ii. 56, *non R. Br.* Herba acaulis 2–3-pedalis, foliis plerisque in rosulam basalem confertis, 1–1½-pedalibus, 3–4 lin. latis, saturate viridibus, basi et margine purpurascentibus, basi longe vaginantibus, marginibus siccitate revolutis haud asperis. Folia caulina pauca distantia. Panicula 1–2-pedalis laxa anguste thyrsoidea, ramis brevibus ascendentibus, infimis distantibus foliis valde reductis bracteatis, ultimis paucifloris corymbosis, pedicellis cernuis 6–9 lin. longis. Bracteæ ultimæ minutæ lanceolatæ. Perianthium cæruleum 4 lin. longum, segmentis omnibus medio confertim 5-nervatis. Stamina segmentis paulo breviora, antheris sordide flavis 2 lin. longis, struma citrina anthera 6–8plo breviore, filamento strumam superante. *Australia temperata occidentalis et orientalis*, Sieber 198! Preiss 1537! &c. *Tasmania*, Gunn 564! Floret post *cæruleam* in hortis nostris. (*V. v. in hort. Kew.*)

11. D. DIVARICATA, *R. Br. Prod.* 280, *non Kunth, Enum.* v. 47. Herba acaulis 2–3-pedalis, foliis plerisque in rosulam basalem aggregatis pedalibus et ultra 5–6 lin. latis basi longe vaginantibus marginibus haud asperis. Folia caulina pauca valde reducta. Panicula deltoidea laxissima pedalis et ultra, ramis valde compositis divaricatis ultimis laxe racemosis, pedicellis patulis vel interdum deflexis 3–9 lin. longis. Bracteæ minutæ lineares. Perianthium 3–4 lin. longum cæruleum segmentis omnibus medio dense 5-nervatis. Antheræ lanceolatæ 2 lin. longæ strumam multo superantes. *Australia occiden-*

talis temperata, Drummond! Oldfield 593! &c. Cum *D. revoluta* jungit cl. Mueller, Fragm. vi. 121.

Species exclusa.

DIANELLA DUBIA, *H., B. & K. Nov. Gen.* t. 675, = Anthericum coarctatum, *Ruiz et Pavon, Fl. Peruv.* tab. 299, est *Eccremis*, Willd., genus Anthericearum, sensu nostro.

Tribus VI. ASPIDISTREÆ.

19. ASPIDISTRA, *Gawl.*

Bot. Reg. t. 628; *Endl. Gen.* no. 1191; *Kunth, Enum.* v. 311.—Macrogyne, *Link et Otto, Ic. Select.* 69, t. 31.—Porpax, *Salisb. Gen.* 9.

Perianthium luridum magnum carnosum, tubo gamophyllo campanulato, dentibus sæpissime 8 deltoideis flore expanso patulis. *Antheræ* 8, infra faucem tubi sessiles, oblongæ introrsæ longitudinaliter dehiscentes. *Ovarium* minutum globosum sessile 4-loculare, ovulis in loculo geminis; stylus cylindricus; stigma magnum peltatum obscure lobatum, faucem tubi claudens, radiis 4 ante angulum marginalem dichotomis. *Bacca* magna carnosa, seminibus turgidis in loculo solitariis.

1. A. LURIDA, *Gawl. Bot. Reg.* t. 628; *Bot. Mag.* t. 2499; *Kunth, Enum.* v. 311.—A. punctata, *Lindl. Bot. Reg.* t. 977; *Kunth, Enum.* v. 312. —Macrogyne convallariæfolia, *Link et Otto, Ic. Select.* 69, t. 31.—Rhizoma crassum carnosum nodulosum late reptans. Folia haud rosulata distincte petiolata erecta oblanceolata 1–2-pedalia medio 1½–2 poll. lata acuta, ad petiolum sensim longe attenuata, utrinque viridia glabra membranacea firma distincte costata, venis obliquis 4–6 validioribus, intermediis crebris gracilioribus. Flores ex rhizomate solitarii, pedunculis erectis 9–12 lin. longis, bracteis 4–5 scariosis deltoideis persistentibus instructis, supremis perianthium amplectentibus. Perianthium cernuum, 9–12 lin. longum, extra tubum viridulum, limbo luride purpureo, intus punctatum. *China*; *Himalaya orientalis in ditione Mishmi*, Griffith, 5887! et *Khasia*, Griffith!

20. PLECTOGYNE, *Link.*

Link in Otto et Dietr. Gartenzeit. 1834, no. 34; *Kunth, Enum.* v. 313.—Aspidistræ sp., *Blume.*

Perianthium magnum carnosum albidum purpureo suffusum et punctatum, tubo gamophyllo campanulato, dentibus sæpissime

8 deltoideis flore expanso falcatis facie medio sulcatis prope marginem lamellatis. *Antheræ* 8 ad medium tubi insertæ, biloculares, introrsæ, secus filamentum breve crassum decurrentes. *Ovarium* minutum sessile 4-loculare; ovulis in loculo 4–6; stylus crassus cylindricus; stigma explanatum, faucem tubi claudens, sinibus 8 verticalibus profundis instructum. *Bacca* carnosa, seminibus in loculo paucis. Tab. XVIII.

1. P. VARIEGATA, *Link et Kunth, locis citatis.*—Aspidistra elatior, *Blume in Tijdschrift voor Nat.* i. 76, t. 4 et 3 *d*. Rhizoma crassum carnosum. Petioli firmi erecti canaliculati 4–6 poll. longi. Folia oblongo-lanceolata sesquipedalia medio 3–4 poll. lata acuta basi longe cuneata subcoriacea utrinque viridia glabra distincte costata venis perspicuis obliquis inæqualibus. Flores ex rhizomate solitarii pedunculis 1–1½ poll. longis, bracteis 4 magnis scariosis instructis, 2 supremis florem amplectentibus. Perianthium 8–9 lin. longum dentibus tubo late campanulato æquilongis. Stigma dorso albidum, facie purpurascens os tubi perfecte claudens. *Japonia* (v. v. in Hort. Kew.). Forma adest foliis albo variegatis.

21. TUPISTRA, *Gawl.*

Bot. Mag. t. 1655; *Endlich. Gen.* no. 1190; *Kunth, Enum.* v. 315.—Macrostigma, *Kunth, Enum.* v. 319.—Platymetra, *Noronha in Salisb. Gen.* 9.

Perianthium carnosum luridum, tubo campanulato, dentibus 6 raro 8 deltoideis flore expanso falcatis tubo brevioribus. *Antheræ* 6 (raro 8) ad faucem tubi sessiles oblongæ introrsæ longitudinaliter dehiscentes. *Ovarium* sessile ovoideum triloculare, ovulis in loculo 2 erectis collateralibus; stylus filiformis ovarium 2–3plo superans; stigma maximum peltatum faucem perianthii claudens obscure lobatum. *Bacca* carnosa, seminibus magnis turgidis solitariis, albumine firmo, testa obscure brunnea.

1. T. SQUALIDA, *Gawl. Bot. Mag.* t. 1655; *Bot. Reg.* t. 704; *Lodd. Cab.* t. 515; *Kunth, Enum.* v. 316.—T. nutans, *Wall. Bot. Reg.* t. 1333; *Hook. Bot. Mag.* t. 3054; *Kunth, Enum.* v. 318.—Macrostigma tupistroides, *Kunth, Enum.* v. 319; *Regel, Gartenf.* t. 192. Rhizoma crassum carnosum. Folia oblanceolata erecta longe petiolata 2–3-pedalia medio 2–4 poll. lata ad apicem et basin angustata acuta utrinque viridia membranacea distincte costata venis crebris inæqualibus obliquis. Pedunculus radicalis 3–6-pollicaris basi foliis parvis lanceolatis scariosis bracteatis. Spica densa nutans 3–6-polli-

caris 15–18 lin. crassa. Bracteæ magnæ scariosæ deltoideæ. Perianthium 6–8 lin. longum luride violaceum vel tubo viridulum, dentibus tubi ore 3–4 lin. lato 1½–2plo brevioribus. Bacca 9–12 lin. crassa. *Himalayæ orientalis regio tropicalis, alt.* 2000–5000 *pedes,* Wallich! Hk. fil.! Griffith 5884! 5885! Icon Cathcart. inedita!

Species dubia.

2. T? SINGAPUREANA, *Wall. Cat.* 5195. Caulis lignosus 3–4 lin. crassus. Folia inferiora segregata, superiora plurima rosulata oblongo-lanceolata 6–12 poll. longa medio 1½–2 poll. lata petiolata ad apicem et basin angustata membranacea utrinque viridia glabra, venis verticalibus 6 validioribus, intermediis gracilioribus segregatis, venulis transversalibus haud obviis. Petioli 3–4 poll. longi canaliculati basi lanceolati. Flores in spicam confertam brevem pedunculatam dispositi. Pedunculus 3–4-pollicaris foliis lanceolatis parvis sessilibus imbricatis bracteatus. Perianthium ignotum. Bracteæ persistentes patulæ lanceolatæ 3–6 lin. longæ. Bacca sessilis leviter trilobata magnitudine pisi. *Singapore in sylvis,* Wallich!

22. GONIOSCYPHA, *Baker.*

Perianthium carnosum, tubo gamophyllo oblongo-cylindrico sulcato, segmentis 6 deltoideis carnosis imbricatis crenulatis tubo quadruplo brevioribus, flore expanso patulis. *Antheræ* 6 oblongæ ad faucem tubi sessiles introrsæ longitudinaliter dehiscentes, filamentis cum tubo connatis perspicuis. *Ovarium* parvum sessile ovoideum triloculare, ovulis in loculo geminis; stylus filiformis ovarium 3–4plo superans; stigma parvum capitatum. *Baccam* non vidi. *Ab generibus reliquis stigmate parvo recedit.* Tab. XIX.

1. G. EUCOMOIDES, *Baker.* Rhizoma non vidi. Folia petiolo distincto 4-pollicari instructa, oblonga 12–15 poll. longa, medio 5–6 poll. lata acuta, ad petiolum cuneato-rotundata, glabra, firma membranacea, utrinque viridia, distincte costata, venis perspicuis obliquis curvatis, 10–12 validioribus, intermediis gracilioribus. Scapus 8–9-pollicaris, basi vaginis scariosis bracteatus. Spica densissima 3-pollicaris, expansa 8–9 lin. crassa. Bracteæ lineari-subulatæ 6–9 lin. longæ protrusæ persistentes, supremæ multæ floribus nullis in axillis instructæ. Perianthium 4–4½ lin. longum, tubo 1 lin. crasso, segmentis crassis patulis, antheris 1 lin. longis e fauce protrusis, stylo 2 lin. longo. *Himalaya orientalis in ditione Bootan,* Booth! (Nuttall in Herb. Kew.).

23. Campylandra, *Baker*.

Perianthium carnosum flavum, tubo campanulato gamophyllo limbo 6-fido dentibus deltoideis imbricatis tubo triplo brevioribus. *Stamina* 6 supra medium tubi inserta, filamentis crassis brevibus arcte decurvatis, antheris oblongis bilocularibus introrsis longitudinaliter dehiscentibus. *Ovarium* parvum ampullaceum triloculare, ovulis in loculo duobus collateralibus; stylus brevis cylindricus; stigma peltatum, faucem tubi claudens, lobis tribus brevibus patulis emarginatis. *Bacca* carnosa 1–3-sperma, seminibus turgidis magnitudine pisi, albumine corneo, testa obscure atra membranacea. Tab. XX.

1. C. aurantiaca, *Baker*.—Tupistra? aurantiaca, *Wall. Cat.* 5194. Rhizoma crassum suberectum fibris copiosis pilosis. Folia ad rosulam 6–8 lanceolata 1–1½-pedalia 1–1½ poll. lata acuta sessilia supra basin longe attenuata flaccida viridia distincte costata venis crebris inæqualibus obliquis immersis. Spica densa subsessilis vel breviter pedunculata 2–3-pollicaris. Bracteæ membranaceæ lanceolatæ virides persistentes 6–12 lin. longæ glanduloso-denticulatæ. Perianthium 5 lin. longum. *Himalayæ orientalis Sikkim*, 4000–6000 *pedes*, Dr. Hooker! Griffith, 5886! icon Cathcart.! *Nepalia*, Wallich! *Bhotan*, Griffith! *Mishmi*, Griffith, 5888!

24. Rohdea, *Roth*.

Nov. Gen. 179; *Schult. fil. Syst.* vii. 19; *Kunth, Enum.* v. 320. —Rhodea, *Endlich. Gen.* no. 1189.—Orontii sp., *Thunb.*— Titragyne, *Salisb. Gen.* 9.

Perianthium albidum carnosum urceolato-hexagonum gamophyllum obscure obtuse 6-lobatum. *Stamina* 6 ad faucem subsessilia, antheris parvis oblongis introrsis longitudinaliter dehiscentibus. *Ovarium* sessile globosum triloculare, ovulis in loculo 2 collateralibus erectis; stylus subnullus; stigma dilatatum triquetrum laciniis divergentibus subrecurvatis. *Bacca* carnosa aurantiaca, seminibus turgidis sæpe solitariis, albumine firmo, testa membranacea.

1. R. japonica, *Roth & Kunth, locis citatis*.—Orontium japonicum, *Thunb. Bot. Mag.* t. 898. Rhizoma crassum carnosum, obliquum. Folia omnia radicalia ad rosulam 9–12 suberecta sessilia oblanceolata pedalia 2–3 poll. lata coriacea glabra viridia acuta crebre verticaliter nervata. Scapus erectus 3–8-pollicaris sursum incrassatus. Spica densissima 1–2-pollicaris 6–8 lin. crassa. Bracteæ deltoideæ scariosæ. Perianthium 2 lin. longum et crassum. *Insulæ Japonia et Tsus Sima, perdiu in hortis nostris culta.*

Tribus VII. STREPTOPEÆ.

25. MEDEOLA, *Gronov.*

Gronov. Fl. Virgin. 55; *Linn. Sp.* 483; *Endlich. Gen.* no. 1178; *Kunth, Enum.* iv. 277; *A. Gray, Man.* edit. 5, 223.—Gyromia, *Nutt. Gen.* i. 238.

Perianthium corollinum 6-partitum caducum pallide flavido-viridulum, segmentis lanceolatis acutis flore expanso revolutis. *Stamina* 6 hypogyna inclusa, filamentis subulatis, antheris oblongis extrorsum affixis secus margines dehiscentibus. *Ovarium* sessile globosum, ovulis in loculo 5–6; styli 3 exserti falcati subulati e basi distincti. *Bacca* globosa atro-purpurea seminibus triquetris, testa brunnea, albumine firmo.

1. M. VIRGINICA, *L. Sp.* 483; *Kunth & A. Gray, locis cit.* Rhizoma late reptans 1½–3 lin. crassum. Caulis fragilis 1–1½-pedalis, foliis 6–9 in verticillum solitarium prope medium caulis impositis. Folia oblanceolata membranacea acuta sessilia patentia 3–4 poll. longa, e medio ad basin attenuata, inter venas tres verticales reticulato-venulosa. Umbella terminalis, foliis tribus parvis ovatis bracteata, 6–10-flora, pedicellis cernuis inarticulatis 6–15 lin. longis. Perianthium 3–4 lin. longum. Styli 5–6 lin. longi. *America borealis orientalis a Canada ad Georgiam et Carolinam.*

26. CLINTONIA, *Rafin.*

Journ. Phys. lxxxix. 102; *Kunth, Enum.* v. 156; *A. Gray, Man.* edit. 5, 529, *non Lindley.*—Xeniatrum, *Salisb. Gen.* 58.—Convallariæ, Smilacinæ et Dracænæ sp. *auct.*

Perianthium infundibulare 6-partitum corollinum albo-viridulum extus pilosum, segmentis oblanceolatis caducis æqualibus dorso distincte multinervatis. *Stamina* 6 subhypogyna, filamentis subulatis rectis perianthio æquilongis vel brevioribus, antheris oblongis introrsum affixis secus margines dehiscentibus. *Ovarium* sessile triloculare, ovulis in loculo sæpissime multis, in *C. umbellata* geminis; stylus filiformis, apice stigmatoso capitato vel obscure tricuspidato. *Bacca* carnosa cærulea, seminibus plerumque multis triquetris, testa pallida vel brunnea membranacea, albumine firmo. *Herbæ acaules, rhizomate longe reptante, foliis* 2–4 *latis oblongis vel oblanceolatis membranaceis ad basin angustatis costatis crebre nervatis venulis transversalibus obscu-*

ris, scapis pilosis nudis vel medio bracteatis, floribus parvis vel mediocribus umbellatis vel racemosis.

Ovula in loculo gemina. Flores parvi......... 1. *C. umbellata.*
Ovula in loculo plura. Flores mediocres.
Flores solitarii, raro gemini .... 2. *C. uniflora.*
Umbella terminalis 3–4-flora, floribus segregatis sæpe additis.
Folia margine ciliata .... 3. *C. borealis.*
Folia margine glabra ... 4. *C. alpina.* 5. *C. udensis.*
Umbella terminalis 10–20-flora floribus segregatis additis.
6. *C. Andrewsiana.*

1. C. UMBELLATA, *Torrey, New York*, 301; *A. Gray, Man.* edit. 5, 529.—C. multiflora, *Beck, Bot.* 358; *Kunth, Enum.* v. 157.—Convallaria umbellulata, *Mich. Flor.* i. 202.—Smilacina umbellata, *Desf. Ann. Mus.* ix. 53, t. 8.—S. borealis, *Gawl. Bot. Mag.* t. 1155, *non* t. 1403.—Maianthemum umbellatum, *Link, Enum.* i. 343. Herba 1–1½-pedalis. Folia 4–5 ascendentia oblongo-lanceolata 6–9 poll. longa acuta ad basin amplectentem angustata distincte costata ad marginem et faciem inferiorem distincte ciliata venis crebris gracilibus obliquis. Scapus gracilis 9–12-pollicaris ubique pilosus nudus vel prope medium bractea lanceolata præditus. Flores 10–40 simpliciter umbellati, pedicellis pilosis rectis 4–9 lin. longis. Perianthium 3–4 lin. longum, albidum, segmentis oblanceolatis 5-nervatis 1 lin. latis. Stamina perianthio æquilonga, antheris oblongis 1 lin. longis. Ovula in loculo gemina. Stylus 2–2½ lin. longus, stigmate capitato. Bacca cærulea magnitudine pisi. *Kentucky, Carolina, et Virginia ad montes Alleghanies.*

2. C. UNIFLORA, *Kunth, Enum.* v. 159; *Wood, Proc. Acad. Phil.* 1868, 174.—Smilacina uniflora, *Menzies in Hook. Flor. Bor.-Am.* ii. 175, t. 190. Herba erecta ½–1-pedalis rhizomate gracili longe reptante. Folia subbasalia 2–3 oblanceolata vel oblonga acuta vel cuspidata ascendentia 4–9 poll. longa membranacea distincte ciliata distincte costata venis gracillimis obliquis. Scapus gracillimus 3–6-pollicaris, sæpissime uniflorus raro biflorus supra medium bractea subulata raro lanceolata præditus pilis reflexis perspicuis dense vestitus. Perianthium 9–10 lin. longum, segmentis albidis oblanceolatis 2–3 lin. latis distincte 7–9-nervatis albidis dorso pilosis. Stamina perianthio triente breviora, antheris linearibus 2 lin. longis. Stylus 5–6 lin. longus, stigmate capitato. Bacca 5–6 lin. crassa, cærulea, seminibus in loculo 8–10. *Columbia britannica*, Menzies! Nuttall! Douglas! &c. *California*, W. Lobb 250!

3. C. BOREALIS, *Raf. Atl. Journ.* 120; *Torrey, Flora New York*, 300; *A. Gray, Man.* edit. 5, 529.—Dracæna borealis, *Ait. Hort. Kew.* i. 454,

t. 5; *Bot. Rep.* t. 206.—Smilacina borealis, *Gawl. Bot. Mag.* t. 1403.—
—Convallaria borealis, *Poir. Encyc.* v. 737. Herba ½–1½-pedalis rhizomate longe reptante. Folia 3–4 ascendentia oblonga vel oblanceolata 4–6 poll. longa acuta vel cuspidata ad basin amplectentem sensim attenuata membranacea utrinque glabra margine ciliata distincte costata venis crebris verticalibus gracilibus inæqualibus. Scapus gracilis 6–12-pollicaris superne pubescens. Flores 3–6 omnes umbellati vel 2 infra umbellam impositi, pedicellis 3–12 lin. longis pilosis, floriferis apice cernuis. Perianthium 6–8 lin. longum, segmentis oblanceolatis albo-viridulis dorso pilosis 7–9-nervatis supra medium 1½–2 lin. latis. Stamina perianthio æquilonga, antheris oblongis 1 lin. longis. Ovula in loculo 12–20. Stylus 6–7 lin. longus, stigmate capitato demum exserto. Bacca cærulea. *Nova Scotia, Canada, Columbia britannica, Terra Nova ad Virginiam.*

4. C. ALPINA, *Kunth, Enum.* v. 159.—Smilacina alpina, *Royle, Ill. Him.* 380. Herba erecta ½–2-pedalis. Folia 3–4 suberecta oblongo-oblanceolata 4–9 poll. longa, supra medium 2–4 poll. lata, cuspidata costata utrinque viridia glabra venis crebris gracillimis subæqualibus. Scapus nudus primum albido-pilosus folium duplo superans. Racemus 6–15-florus, floribus supremis umbellatis, post anthesin laxissimus, pedicellis pilosis floriferis 3–9 lin. longis subrectis, fructiferis arcuatis 12–18 lin. longis. Bracteæ parvæ lineares vel lanceolatæ caducæ. Perianthium albidum 4–4½ lin. longum, segmentis oblanceolatis 1 lin. latis, 5–7-nervatis. Stamina perianthio paulo breviora, antheris oblongis ½ lin. longis. Stylus 2 lin. longus, apice stigmatoso obscure tricuspidato. Bacca 3–4 lin. crassa, seminibus in loculo 6–8. *Himalaya centralis et orientalis a Gurwhal ad Bhotan, regio temperata* 8000–11,000 *pedes,* Royle! Strachey et Winterbottom! Dr. Hooker! Griffith 5851!

5. C. UDENSIS, *Traut. et Meyer, Fl. Ochot.* no. 316; *Maxim. Prim. Amur.* 278; *Miquel, Ann. Mus. Lug.-Bat.* iii. 149. Herba erecta ½–2-pedalis. Folia ascendentia 3–4 oblonga cuspidata demum 9–12 poll. longa, supra medium 3–4 poll. lata glaberrima margine haud ciliata distincte costata venis crebris gracilibus obliquis. Scapus nudus 6–12-pollicaris apice solum leviter puberulus. Flores 3–4 umbellati vel 5–8, inferiores distantes, pedicellis ebracteatis floriferis rectis pilosis 3–9 lin. longis, fructiferis calvatis 1–2 poll. longis. Perianthium 5–6 lin. longum, segmentis oblanceolatis 5-nervatis, 1½–2 lin. latis. Stamina perianthio distincte breviora, antheris oblongis ½ lin. longis. Stylus 2–2½ lin. longus, apice stigmatoso obscure tricuspidato. Bacca cærulea magnitudine cerasi, seminibus in loculo 4–6. *Japonia et Siberia orientalis.* An sit varietas mera *C. alpinæ*?

6. C. ANDREWSIANA, *Torrey, Bot. Whipple,* 94.—C. Andrewsii, *Wood,*

Proc. Acad. Phil. 1868, 174. Herba erecta 1–2-pedalis, foliis 4–6 oblongis sessilibus acutis membranaceis 6–9 poll. longis, medio 3–4 poll. latis utrinque glabris viridibus margine obscure ciliatis venis valde obliquis. Scapus folia eminens, medio bractea lineari vel lanceolata præditus. Umbellæ 2–6, terminalis 12–20-flora, laterales 4–6-floræ. Pedicelli 6–12 lin. longi. Perianthium purpureum 6–8 lin. longum, segmentis oblanceolato-spathulatis 5–7-nervatis. Filamenta perianthio duplo breviora. Ovula in loculo 8–10. Bacca magnitudine pisi magni, stigmate obscure trilobato. *California,* Dr. Andrews, Dr. Bigelow, Bolander !

27. PROSARTES, *D. Don.*

D. Don, Linn. Trans. xviii. 532 ; *Kunth, Enum.* iv. 202 ; *A. Gray, Man.* edit. 5, p. 528.—Uvulariæ et Streptopi sp. *auct.*

Perianthium corollinum viridulum 6-partitum diutine infundibulare segmentis oblanceolato-spathulatis acutis æqualibus basi saccatis. *Stamina* 6 inclusa vel exserta, filamentis filiformibus, antheris ligulatis paulo supra basin affixis bilocularibus extrorsis secus margines dehiscentibus. *Ovarium* sessile globosum triloculare, ovulis in loculo geminis collateralibus pendulis, vel in *P. trachycarpa* pluribus horizontalibus. Stylus filiformis, apice stigmatoso breviter tricuspidatus, raro indivisus. *Bacca* carnosa rubra cuspidata, seminibus turgidis, testa pallida membranacea, albumine corneo. *Herbæ rhizomatosæ, caulibus dimidio inferiore nudis, dimidio superiore foliatis puberulis dichotome ramosis, foliis oblongis acutis sessilibus membranaceis venis verticalibus paucis venulis flexuosis connexis, floribus viridulis ex axilla folii superioris* 1–4 *umbellatis, pedicellis puberulis.*

Bacca 3–6-sperma.

Antheræ exsertæ filamentis 4–6plo breviores. 1. *P. lanuginosa.*

Antheræ inclusæ filamentis 1½–2plo breviores. 2. *P. Menziesii.*

Bacca polysperma.............................. 3. *P. trachycarpa.*

1. P. LANUGINOSA, *D. Don, Linn. Trans.* xviii. 532 ; *Kunth, Enum.* iv. 203 ; *A. Gray. Man.* edit. 5, p. 528.—Streptopus lanuginosus, *Michx. Flor.* i. 201 ; *Schult. fil. Syst. Veg.* vii. 311.—Uvularia lanuginosa, *Pers. Syn.* i. 360 ; *Ker, Bot. Mag.* t. 1490. Caulis fragilis puberulus 2–3-pedalis dimidio superiore foliatus dichotome furcatus. Folia alterna oblonga ascendentia acuminata sessilia basi inæqualiter rotundata 2–4 poll. longa supra viridia glabra subtus pubescentia venis perspicuis 4, intermediis paucis immersis, venulis transversalibus per-

spicuis. Flores 1–3 ex axillis foliorum superiorum, pedicellis cernuis pilosis 6–9 lin. longis apice articulatis. Perianthium 6–9 lin. longum, segmentis viridulis lanceolatis distincte unguiculatis. Stamina exserta, filamentis glabris, antheris $1\frac{1}{2}$ lin. longis. Stylus 5 lin. longus glaber apice breviter tricuspidatus. Bacca globosa lævis cuspidata. *Columbia britannica, Montes Scopulosi, provinciæ fœderatæ Americæ borealis.*

Var. HOOKERI, *Baker.*—Prosartes Hookeri, *Torrey, Bot. Whipple,* 88; *S. Wats. Bot.* 40 *Parall.* 344.—Uvularia lanuginosa, var. major, *Hook. Flor. Bor.-Am.* ii. 174.—Robustior, minus puberula, foliis latioribus basi profunde cordatis, ramos amplectentibus. *Insula Vancouver, Oregon, Columbia britannica, California.*

Var. TRACHYANDRA, *Baker.*—Prosartes trachyandra, *Torrey, Bot. Whipple,* 88; *S. Wats. Bot.* 40 *Parall.* 345. Folia basi vix cordata. Antheræ hirtellæ. Stylus apice haud divisus. Bacca oblonga basi et apice breviter attenuata lævis rostrata 4–8 lin. longa, ovulis in loculo 2–4. *Sierra Nevada Californiæ,* Dr. Bigelow! Dr. Kellogg.

2. P. MENZIESII, *D. Don, Proc. Linn.* Dec. 1839; *Kunth, Enum.* iv. 203.—Uvularia Smithii, *Hook. Flor. Bor.-Am.* ii. 174, t. 189; *Kunth, Enum.* iv. 667.—U. puberula, *Sm. in Rees's Cyclop. non Michx.* Caulis 2–3-pedalis dichotome furcatus sursum flexuosus puberulus. Folia oblonga sessilia acuta 2–3 poll. longa basi inæqualiter rotundata membranacea utrinque glabra, venis verticalibus 6–10, venulis transversalibus flexuosis perspicuis connexis. Flores ex axillis supremis 1–3, pedicellis puberulis filiformibus cernuis 5–6 lin. longis. Perianthium infundibulare viridulum 7–9 lin. longum, segmentis oblanceolatis acutis 2–3 lin. latis. Stamina perianthio triente breviora, antheris filamentis $1\frac{1}{2}$–2plo brevioribus. Stylus $4\frac{1}{2}$–5 lin. longus apice brevissime tricuspidatus. *Columbia britannica,* Dr. Scouler! *Nootka,* Menzies!

3. P. TRACHYCARPA, *S. Wats. Bot.* 40 *Parall.* 344. Caulis puberulus 1–$1\frac{1}{2}$-pedalis dimidio superiore foliatus dichotome furcatus. Folia alterna oblonga acuminata 2–4 poll. longa basi inæqualiter cordata membranacea subtus puberula demum subglabra venis verticalibus 6–10 inæqualibus. Flores ex axillis supremis 1–3, pedicellis pilosis. Perianthium albidum 4–6 lin. longum, segmentis oblanceolatis diutine ascendentibus basi leviter gibbosis. Stamina exserta antheris glabris $1\frac{1}{2}$ lin. longis. Stylus exsertus apice breviter tricuspidatus. Ovula in loculo 4–6 horizontalia. Bacca 4–6 lin. crassa triquetro-globosa scabra pallide rubra 8–12-sperma. *Montes Scopulosi in ditionibus Washington, Colorado, &c., alt.* 6000–9000 *pedes,* Bourgeau! Lyall! Parry, &c.

28. Disporum, *Salisb.*

Salisb. Hort. Trans. Feb. 1812, i. 331, *Gen.* 58; *D. Don, Linn. Trans.* xviii. 521; *Kunth, Enum.* iv. 206.—Drapiezia, *Blume, Enum. Jav.* i. 8.—Uvulariæ et Streptopi sp. *auct.*

Perianthium 6-partitum viridulo-purpureum vel albidum, diutine infundibulare, segmentis æqualibus oblanceolato- vel oblongo-spathulatis basi saccatis vel calcaratis. *Stamina* 6 inclusa hypogyna filamentis rectis applanatis, antheris ligulatis bilocularibus extrorsis supra basin affixis. *Ovarium* sessile globosum triloculare, ovulis in loculo 2 axillaribus collateralibus; stylus filiformis, stigmata tria subulata falcata superans. *Bacca* carnosa, seminibus sæpissime solitariis turgidis, testa brunnea, albumine corneo. *Herbæ glabræ rhizomatosæ, caulibus superne dichotome furcatis foliatis, deorsum bracteis membranaceis ad nodos instructis, foliis distantibus alternis glabris oblongis vel lanceolatis subpetiolatis acuminatis, floribus in umbellas axillares sessiles vel pedunculatas cernuas dispositis, bracteis nullis, pedicellis inarticulatis, baccis parvis nigris.*

Perianthii segmenta basi distincte calcarata. 1. *D. calcaratum.*
Perianthii segmenta basi solum saccata.
Segmenta obtusa 4–5 lin. lata ...... 2. *D. sessile.*
Segmenta acuta $1\frac{1}{2}$–3 lin. lata.
Perianthium viridulum segmentis basi longe spathulatis. 3. *D. pullum.*
Perianthium albidum, segmentis basi vix spathulatis.
Flores multi umbellati .... 4. *D. Leschenaultianum.*
Flores ad axillam folii superioris solitarii. 5. *D. smilacinum.*

1. D. calcaratum, *D. Don, Linn. Trans.* xviii. 516; *Kunth, Enum.* iv. 207.—Uvularia calcarata, *Wall. Cat.* 5087. Caulis glaber 1–2-furcatus. Folia sessilia vel subpetiolata subdistantia oblongo-lanceolata acuminata 2–3 poll. longa, utrinque viridia glabra venis validioribus 4–6, intermediis gracilioribus crebris. Umbellæ in axillis foliorum superiorum sessiles vel breviter pedunculatæ 5–6-floræ pedicellis cernuis 6–9 lin. longis. Perianthium viridulum 9–10 lin. longum, segmentis lanceolatis acutis calcari 3 lin. longo præditis. Antheræ $1\frac{1}{2}$–2 lin. longæ, filamentis multo breviores. Stylus gracilis 3–4 lin. longus, stigmata 2–3plo superans. *Himalaya orientalis, Silhet,* Gomez! *Sikkim,* 7000 *pedes,* Dr. Hooker!

Var. Hamiltonianum, *Baker*. (Uvularia Hamiltoniana, *Wall. Cat.* 5088 A, B, C, *ex parte.*—U. Betua, *Hamilton, MSS.*—Disporum Wallichii et Hamiltonianum, *D. Don, Linn. Trans.* xviii. 516; *Kunth, Enum.* iv. 207), ab typo solum recedit calcaribus segmentorum brevioribus circiter 1 lin. longis. *Himalayæ occidentalis regio temperata* (*Sikkim, Nepaul, Silhet*), Wallich! Hamilton! Hooker!

2. D. sessile, *D. Don, Prod. Nep.* 50; *Schult. fil. Syst.* vi. 370; *Kunth, Enum.* iv. 208.—Uvularia sessilis, *Thunb. Jap.* 135, *excl. syn.* Caulis bipedalis 1–2-furcatus triente inferiore nudo. Folia subpetiolata distantia ascendentia oblonga vel oblongo-lanceolata 3–4 poll. longa, acuta vel acuminata utrinque viridia glabra, venis validioribus 4, intermediis gracilioribus crebris. Flores ex axillis foliorum superiorum solitarii vel bini vel raro 3, pedicellis cernuis 6–9 lin. longis, haud pedunculatis. Perianthium albidum infundibulare 10–12 lin. longum, segmentis oblongo-spathulatis subobtusis distincte multinervatis supra medium 3–4 lin. latis, basi saccatis. Genitalia perianthio vix breviora antheris 2 lin. longis. Stylus semipollicaris, stigmata falcata 5–6plo superans. *Japonia*, Small! Maingay! Oldham! &c.

3. D. pullum, *Salisb. Hort. Trans.* i. 330; *D. Don, Linn. Trans.* xviii. 621; *Kunth, Enum.* iv. 208.—Uvularia chinensis, *Ker, Bot. Mag.* t. 916; *R. Br. Prod.* 274.—Streptopus chinensis *et* peduncularis, *Smith in Rees's Cyclop.*—D. fulvum, *D. Don, Prodr. Nep.* 50.—D. Pitsutum, *D. Don, Prod. Nep.* 50; *Linn. Trans.* xviii. 519; *Kunth, Enum.* iv. 207.—Uvularia umbellata, *Wall. Plant. Rar.* iii. 43, t. 269; —D. multiflorum, *D. Don, Linn. Trans.* xviii. 518; *Kunth, Enum.* iv. 207.—D. Horsfieldii, *D. Don, Linn. Proc. Nov.* 1839.—Uvularia Hamiltoniana, *Wall. Cat.* 5088 C *ex parte,* D.—Drapiezia multiflora, *Blume, Enum.* i. 8; *Schult. fil. Syst.* vii. 312, 1672. Caulis glaber 2–3-pedalis dimidio superiore copiose ramosus. Folia alterna distantia ascendentia subpetiolata oblonga vel lanceolata acuminata 2–6 poll. longa, membranacea utrinque viridia glabra venis validioribus 6, intermediis gracilioribus crebris, venulis transversalibus occultis. Flores ex axillis multis in umbellas cernuas 4–10-floras sessiles vel pedunculatas dispositi, pedicellis 6–12 lin. longis. Perianthium 9–12 lin. longum, purpureo-viridulum, segmentis oblanceolato-spathulatis supra medium 2–3 lin. latis, basi saccatis. Genitalia perianthio paulo breviora, antheris 1½–2 lin. longis. Stylus 4–6 lin. longus, stigmata falcata triplo superans. Bacca magnitudine pisi. *Japonia, China, Himalayæ centralis et orientalis regio temperata, Mons Parasnath, Java, Sumatra.*

Var. parviflorum, *Baker*. (Uvularia parviflora, *Wallich, Asiat. Res.* xiii. 378; *Cat.* 5091 *ex parte.*—Disporum parviflorum, *D. Don, Prodr. Nep.* 50; *Linn. Trans.* xviii. 520; *Kunth, Enum.* iv. 208), ab typo solum

recedit floribus minoribus, perianthio 3–4 lin. longo, segmentis vix ultra 1 lin. latis. *Himalaya orientalis; Poneshie*, D. J. Anderson!

4. D. LESCHENAULTIANUM, *D. Don, Linn. Trans.* xviii. 518; *Kunth, Enum.* iv. 207; *Wight, Ic.* t. 2048.—Uvularia Leschenaultiana, *Wall. Cat.* 5089; *Royle, Ill.* t. 96. fig. 2.—D. ceylanicum et mysorense, *Wight, Ic.* t. 2049. Caulis 1–2-pedalis, dimidio superiore copiose ramosus. Folia semper late oblonga distincte petiolata acuminata 2–4 poll. longa, membranacea utrinque viridia venis validioribus 6–10, intermediis crebris gracilioribus. Flores in umbellas sessiles axillares 3–4-floras dispositi, pedicellis 6 lin. longis. Perianthium albidum 5–6 lin. longum, segmentis acutis oblongo-lanceolatis vix spathulatis basi globosis medio 2–3 lin. latis. Stamina perianthio triente vel ultra breviora, antheris 1–1½ lin. longis. Stylus 2–3 lin. longus, apice stigmatoso brevissime tricuspidato. *Montes Indiæ peninsularis et Zeylaniæ.*

5. D. SMILACINUM, *A. Gray, Bot. Will. et Morrow*, 321; *Bot. Japan*, 414; *Miquel, Ann. Mus. Lug.-Bat.* iii. 147.—Uvularia? viridescens, *Maxim. Prim. Amur.* 273. Caulis flexuosus 1–2-pedalis gracilis glaber simplex vel semel furcatus. Folia distantia ascendentia subpetiolata oblonga acuta 1½–4 poll. longa, medio 12–18 lin. lata membranacea utrinque viridia glabra, venis validioribus 4, intermediis gracilioribus crebris, transversalibus perspicuis. Flores ex axillis folii superioris solitarii, pedicellis floriferis erectis 5–6 lin. longis, fructiferis cernuis subpollicaribus. Perianthium albidum 6–7 lin. longum, segmentis acutis distincte 5-nervatis basi haud calcaratis. Stamina perianthio duplo breviora, antheris 1 lin. longis. Stigmata cum stylo æquilongo 1 lin. longa. *Japonia*, C. Wright! Hodgson! *Siberia orientalis in ditione fluminis Amur*, Maximowicz!

29. STREPTOPUS, *Rich.*

Rich. in Michx. Flor. Bor.-Amer. i. 201, t. 8; *Schult. fil. Syst.* vii. 25, 310; *Endlich. Gen*, no. 1180; *Kunth, Enum.* iv. 204.—Hekorima, *Rafin. New York Med. Repos.* v. 350; *Kunth, Enum.* iv. 203.—Uvulariæ sp., *Linn. &c.*

Perianthium 6-partitum petaloideum infundibulare, segmentis æqualibus oblongis vel lanceolatis acutis multinervatis flore expanso sæpissime falcatis. *Stamina* 6 perianthio 2–3plo breviora, filamentis hypogynis brevibus deltoideis vel lanceolatis, antheris extrorsum supra basin affixis secus margines dehiscentibus apice integris caudatis vel obscure vel distincte bifidis. *Ovarium* sessile triloculare, ovulis in loculo pluribus; stylus filiformis, apice stigmatoso subintegro vel tricuspidato. *Bacca*

rubra carnosa, seminibus oblongis parvis turgidis, testa pallida membranacea, albumine firmo. *Herbæ elatæ sylvestres caulibus fragilibus dichotome furcatis, foliis alternis teneris cordato-amplexicaulibus oblongis acutis venis crebris inæqualibus, venulis transversalibus brevissimis occultis, floribus ex axillis multis cernuis pedicellatis, parvis albidis vel rubellis solitariis vel geminis.*

Stylus apice stigmatoso subintegro; antheræ lineari-caudatæ integræ .... 1. *S. amplexicaulis.*
Stylus profunde tricuspidatus; antheræ oblongæ obscure emarginatæ .... 2. *S. simplex.*
Stylus breviter tricuspidatus; antheræ profunde bifidæ .... 3. *S. roseus.*

1. S. AMPLEXICAULIS, *DC. in Red. Lil.* t. 259; *Kunth, Enum.* iv. 205; *A. Gray, Man. edit.* 5, 529.—Uvularia amplexifolia, *Linn. Sp.* 436; *Waldst. et Ket. Hung.* ii. 182, t. 167.—Streptopus distortus, Mich. Flor. i. 200.—Convallaria dichotoma, *Thib. in Pers. Syn.* i. 373. Herba 2–3-pedalis dimidio superiore ramosa vix rhizomatosa fibris radicalibus densis carnosis. Folia oblonga acuta profunde cordata amplexicaulia membranacea 3–6 poll. longa glabra supra viridia subtus glauca crebre inæqualiter nervata venulis transversalibus brevissimis occultis. Flores in axillis foliorum solitarii vel bini, pedicellis 1–2 poll. longis cernuis superne valde contortis simplicibus vel furcatis. Perianthium albido-viridulum 4–5 lin. longum, segmentis lanceolatis superne falcatis. Stylus 3 lin. longus apice stigmatoso subintegro. Antheræ lineari-caudatæ erectæ 3 lin. longæ filamentis brevissimis. Bacca oblonga rubra seminibus in loculo 812. *Europa centralis, Sibiria orientalis, Japonia, Insulæ Sachalin, America borealis a sinu Awatscha et Grœnlandia ad Pennsylvaniam.*

2. S. SIMPLEX, *D. Don, Prodr. Nep.* 48; *Linn. Trans.* xviii. 530.—S. candidus, *Wall. Cat.* no. 5512.—Hekorima candida, *Kunth, Enum.* iv. 204. Herba 2–3-pedalis haud rhizomatosa caulibus furcatis foliatis flexuosis glabris. Folia oblonga acuminata profunde cordato-amplexicaulia 2–4 poll. longa glabra membranacea supra viridia subtus glaucescentia venis crebris inæqualibus. Flores ex axillis multis solitarii raro gemini pedicellis gracillimis glabris curvato-ascendentibus 2–3 poll. longis. Perianthium albidum late infundibulare 5–6 lin. longum, segmentis oblongis acutis 2–3 lin. latis. Stamina perianthio triplo breviora, antheris oblongis $1\frac{1}{2}$ lin. longis apice integris vel obscure emarginatis filamenta deltoidea duplo superantibus. Stylus 1 lin. longus, stigmatibus falcatis æquilongus. Bacca globosa 3 lin. crassa, seminibus in loculo 5–6. *Himalayæ centralis et orientalis regio temperata* (*Nepaul, Kumaon, Sikkim*), Wallich! Strachey and Winterbottom! Dr. Hooker!

3. S. ROSEUS, *Michx. Flor.* i. 201, t. 18; *Schult. fil. Syst.* vii. 312; *A. Gray, Man. edit.* 5, 529; *Hook. Flor. Bor.-Am.* t. 188 B.—Uvularia rosea, *Pers. Syn.* i. 360; *Ker, Bot. Mag.* t. 1489.—Hekorima dichotoma, *Rafin. Med. Rep. New York,* v. 330; *Kunth,* iv. 204. Herba 2–3-pedalis vix rhizomatosa caule ciliato dimidio superiore ramoso. Folia membranacea oblonga acuminata 2–4 poll. longa profunde cordato-amplexicaulia utrinque viridia venis creberrimis inæqualibus, transversalibus brevissimis haud obviis. Flores ex axillis multis solitarii raro bini pedicellis gracillimis ciliatis 6–9 lin. longis. Perianthium rubellum 4–5 lin. longum, segmentis lanceolatis acutis flore expanso falcatis. Stamina perianthio duplo breviora, antheris 1 lin. longis apice furcatis filamentis brevioribus. Stylus 2–2½ lin. longus apice tricuspidatus. Ovula in loculo plura. *America borealis ab insula Sitka ad Columbiam Britannicam et montes Alleghanies.*

Species ex floribus ignotis dubia.

4. S.? BREVIPES, *Baker.* Rhizoma filiforme late repens. Caulis simplex gracilis glaber 4–6-pollicaris. Folia 5–9 oblonga acuta nullo modo cordato-amplexicaulia tenera membranacea viridia 1½–2 poll. longa venis crebris inæqualibus, transversalibus brevissimis occultis. Flores in axillis foliorum solitarii pedicellis cernuis 3–4 lin. longis. Bacca 3–4 lin. crassa, seminibus pluribus oblongo-clavatis. *Oregon ad Cascade Mountains,* 49° N. lat., Dr. Lyall!

30. CALLIXENE, *Commers.*

Commers. in Juss. Gen. 41; *Gaud. Ann. Sc. Nat.* v. t. 2. fig. 2; *Schult. fil. Syst.* vii. 315; *Endlich. Gen.* no. 1187; *Kunth, Enum.* v. 281; *Hook. fil. Fl. Ant.* ii. 354, *excl. sp.*—Enargea, *Soland. in Gaertn. Fruct.* i. 283, t. 59.

Perianthium corollinum 6-partitum album, segmentis oblongis multinervatis obtusis flore expanso patentibus interioribus basi biglandulosis. *Stamina* 6 perianthio duplo breviora, filamentis linearibus, antheris oblongis extrorsum affixis, secus margines dehiscentibus. *Ovarium* sessile globosum, ovulis in loculo 4–6; stylus filiformis, apice stigmatoso capitatum. *Bacca* carnosa, seminibus paucis turgidis, testa pallida, albumine corneo. *Suffrutices rhizomatosi ramosissimi, ramulis gracillimis firmis angulatis flexuosis foliatis, foliis alternis subsessilibus rigidulis mucronatis basi articulatis caducis, floribus solitariis terminalibus brevissime pedunculatis.*

Perianthium 3–4 lin. longum........................ 1. *C. parviflora.*
Perianthium 6–9 lin. longum........................ 2. *C. marginata.*

1. C. PARVIFLORA, *Hook. fil. Ic.* t. 632; *Flor. New Zeal.* i. 254; *Handb. New Zeal.* 281.—Luzuriaga parviflora, *Kunth, Enum.* v. 281. Suffrutex ramosissimus ½–1-pedalis ramulis angulatis sulcatis flexuosis foliatis. Folia alterna brevissime petiolata ascendentia lanceolata mucronata 9–15 lin. longa 5–7-nervata inter venas reticulata marginibus haud revolutis. Flores solitarii terminales pedicellis brevissimis bracteis minutis brunneis stipatis. Perianthium 3–4 lin. longum, segmentis 1½–2 lin. latis. Genitalia perianthio duplo breviora. *Nova Zelandia.*

2. C. MARGINATA, *Comm. loc. cit.*; *Lam. Ill.* t. 248.—C. magellanica, *Raeuschel.*—Enargea marginata, *Gaertn.*; *Willd. Sp.* ii. 230. Suffrutex ramosissimus ¼–1-pedalis ramis erectis firmis gracillimis, sursum flexuosis angulatis foliatis. Folia alterna sessilia ascendentia oblonga crassa rigidula pallide viridia mucronata 6–9 lin. longa verticaliter 5-nervata marginibus revolutis. Flores in axillis folii superioris ramorum solitarii, pedicellis brevissimis erectis bracteis 2–4 aridis deltoideis brunneis cinctis. Perianthium 6–9 lin. longum, petalis 3–4 lin. latis, odore *Heliotropii.* Antheræ ½ lin. longæ pallide flavæ. *Patagonia, Terra del Fuego, Insula Falkland.*

31. KRUHSEA, *Regel.*

Regel, Fl. Ajan. no. 281; *Maxim. Prim. Amur.* 278.—Smilacina § Monoeranthus, *Led. Fl. Ross.* iv. 128.

Perianthium atro-purpureum, basi gamophyllum, segmentis 6 lanceolatis acutis æqualibus ex ore tubi brevis late falcato-patulis. *Stamina* 6, perianthio 2–3plo breviora, filamentis brevissimis deltoideis profunde perigynis, antheris ovoideis inflexis apice bifidis antice supra basin affixis secus margines dehiscentibus. *Ovarium* sessile globosum, triloculare, stylo nullo, stigmate integro peltato. *Baccam* non vidi. *Habitus et antheræ* Streptopi rosei, *sed perianthio et pistillo longe recedit.*

1. K. TILINGII, *Regel et Maxim. locis cit.*—Smilacina (Monoeranthus) streptopoides, *Led. loc. cit.* Rhizoma filiforme late reptans. Caulis simplex 6–9-pollicaris dimidio superiore flexuoso puberulo foliato. Folia 6–10 alterna oblonga acuta cordato-amplexicaulia 1½–2 poll. longa membranacea viridia ciliata venis crebris inæqualibus, venulis transversalibus brevissimis occultis. Flores ex axillis foliorum multorum solitarii vel raro gemini, pedicellis cernuis gracillimis 3–4 lin. longis, superiores abortivi. Perianthium 1½ lin. longum, expansum 2½ lin. latum. *Sitka,* Eschscholtz; *Ajan,* Tiling, 282! *In ditione fluminis Amur,* Maximowicz.

Genus exclusum.

VERATRONIA, *Miquel, Flor. Ned. Ind.* iii. 553, "genus dubium Melanthacearum fructu baccato," est Palmacea.

Tribus VIII. ASPARAGEÆ.

32. ASPARAGUS, *Linn.*

Linn. Gen. no. 424; *Juss. Gen.* 41; *Endlich. Gen.* no. 1164; *Bresl. Diss.* (*Berol.* 1826); *Kunth, Enum.* v. 57; *Schult. Syst.* vii. xxvii et 317.—Asparagopsis, *Kunth, Act. Acad. Berol.* 1842, 35; *Enum.* v. 76.—Myrsiphyllum, *Willd. Berl. Mag.* 1808, 25; *Enal. Gen.* no. 1165; *Kunth, Enum.* v. 105.—Hecatris, *Salisb. Gen.* 66.—Medeolæ et Dracænæ sp., *Linn. &c.*

Perianthium 6-partitum petaloideum campanulatum vel infundibulare segmentis æqualibus dorso uninervatis ligulatis vel oblanceolatis flore expanso ascendentibus vel patentibus. *Flores* sæpe hermaphroditi, sæpe polygami, masculi ovario rudimentario, ovulis nullis, fœminei staminibus parvis effœtis præditi. Stamina 6 recta inclusa æqualia, filamentis filiformibus vel applanatis prope basin segmentorum insertis, antheris dorsifixis bilocularibus introrsum longitudinaliter dehiscentibus. *Ovarium* sessile ovoideum ovulis in loculo binis vel paucis superpositis. Stylus brevis rectus filiformis apice stigmatoso breviter tricuspidato. *Fructus* globosus baccatus sæpissime monospermus, seminibus globosis vel triquetris, albumine duro, testa nigra nitida. *Herbæ vel suffrutices ramosissimæ sæpe scandentes, foliis minutis bracteiformibus membranaceis basi calcaratis sæpe ad ramos primarios in spinas productis, ramulis sterilibus (cladodiis) sæpissime subulatis fasciculatis, interdum planis linearibus vel ovatis raro solitariis, pedicellis articulatis, floribus minutis albidis racemosis vel e nodis solitariis vel umbellatis. Genus magnum, per totum veteris orbis, zona arctica exclusa, diffusum: specierum magna copia in ditione Capensi disseminata.*

§ EUASPARAGUS (*Asparagus*, Kunth). *Flores polygami. Cladodia subulata vel linearia. Omnes europæi vel asiatici.*

I. Stirps *A. officinalis.* Herbæ vel suffrutices ramis rectis patulis vel ascendentibus, foliis vix spinoso-calcaratis, cladodiis subulatis, pedicellis axillaribus 1–2-nis.

Herbæ ramis virgatis gracillimis.

Rami et ramuli omnes ascendentes.

Cladodia setacea tenuissima .... 1. *A. tenuifolius.*

Cladodia subulata crassiora .... 2. *A. officinalis.*

3. *A. maritimus.*

Rami et ramuli inferiores patuli.

Cladodia robusta 3–6 lin. longa......... 4. *A. Breslerianus.*

Cladodia graciliora 6–15 lin. longa ... 5. *A. oligoclonos.*

6. *A. caspius.* 7. *A. davuricus.*

Suffrutex rigidus cladodiis crassis subpungentibus.

8. *A. aphyllus.*

II. Stirps *A. verticillati.* Suffrutices vel herbæ altæ caulibus flexuosis, ramis et ramulis inferioribus sæpe reflexis, foliis vix spinoso-calcaratis, cladodiis subulatis, pedicellis axillaribus 1–2nis.

Cladodia elongata tenuissima................. 9. *A. trichophyllus.*

10. *A. Lownei.*

Cladodia multa elongata subulato-angulata 11. *A. verticillatus.*

Cladodia multa brevissima subulata......... 12. *A. acutifolius.*

13. *A. brachyphyllus.* 14. *A. brevifolius.* 15. *A. palæstinus.*

Cladodia pauca elongata subulata .... 16. *A. littoralis.*

17. *A. filifolius.* 18. *A. persicus.* 19. *A. Chesneyi.*

20. *A. oligophyllus.* 21. *A. monophyllus.* 22. *A. Griffithii.*

III. Stirps *A. lucidi.* Herbæ vel suffrutices phyllocladiis linearibus, pedicellis axillaribus.

Pedicelli 1–2ni, raro 3–4ni.

Herbæ erectæ ... 23. *A. schoberioides.* 24. *A. filicinus.*

Suffrutex scandens .... 25. *A. lucidus.*

Pedicelli umbellati .... 26. *A. Gaudichaudianus.*

§ Asparagopsis (*Kunth*). Flores hermaphroditi; cladodia subulata vel linearia.

IV. Stirps *A. declinati.* Folia basi vix calcarata. Pedicelli axillares 2–4ni. Cladodia subulata.

Cladodia nulla .... 27. *A. cuscutoides.* 28. *A. denudatus.*

Cladodia brevia 1–3na... 29. *A. virgatus.* 30. *A. capitatus.*

31. *A. crispus.*

Cladodia brevia dense fasciculata .... 32. *A. gracilis.*

33. *A. Burkei.* 34. *A. nodosus.*

35. *A. exuvialis.* 36. *A. dumosus.*

Cladodia elongata modice robusta .... 37. *A. simulans.*
38. *A. declinatus.* 39. *A. arborescens.*
Cladodia elongata setacea tenuissima ...... 40. *A. Macowani.*
41. *A. fœniculaceus.*

V. Stirps *A. umbellati.* Folia basi vix calcarata. Pedicelli axillares multi umbellati. Cladodia subulata.

Cladodia brevia .... 42. *A. pilosus.* 43. *A. multiflorus.*
44. *A. scoparius.* 45. *A. umbellatus.*
Cladodia elongata ...... 46. *A. Rottleri.* 47. *A. umbellulatus.*
48. *A. subulatus.*

VI. Stirps *A. consanguinei.* Suffrutices lignosi, cladodiis subulatis, pedicellis axillaribus 1–2nis, foliis in spinas pungentes productis, ramis ultimis segregatis.

Cladodia crassa brevissima .... 49. *A. stellatus.*
50. *A. microraphis.*
Cladodia pauca subulata brevia .... 51. *A. vaginellatus.*
52. *A. Pauli-Gulielmi.*
Cladodia multa subulata brevia .... 53. *A. plumosus.*
54. *A. Cooperi.* 55. *A. flagellaris.*
56. *A. subulatus.* 57. *A. zanzibaricus.*
58. *A. Petersianus.* 59. *A. Thunbergianus.*
60. *A. consanguineus.*
Cladodia elongata............ .... 61. *A. Jacquemonti.*
62. *A. Eckloni.* 63. *A. rubricaulis.*
64. *A. minutiflorus.* 65. *A. Schweinfurthii.*

VII. Stirps *A. capensis.* Suffrutices lignosi spinosi, cladodiis brevibus subulatis, ramis ultimis dense fasciculatis, pedicellis 1–4nis, floribus ex apice ramulorum solum productis.

Flores subsessiles ...... 66. *A. densus.* 67. *A. capensis.*
68. *A. Nelsoni.*
Flores pedicellati ...... 69. *A. stipulaceus.* 70. *A. Burchellii.*

VIII. Stirps *A. asiatici.* Suffrutices lignosi, cladodiis subulatis, pedicellis axillaribus umbellatis, foliis in spinas pungentes productis, ramis ultimis haud fasciculatis.

Cladodia brevia ...... 71. *A. puberulus.* 72. *A. asiaticus.*
73. *A. africanus.*
Cladodia elongata ... 74. *A. albus.* 75. *A. irregularis.*
76. *A. abyssinicus.* 77. *A. laricinus.*
78. *A. retrofractus.*

IX. Stirps *A. erecti*. Cladodia applanata (phyllocladia). Pedicelli axillares gemini vel umbellati.

Erecti .... 79. *A. erectus*. 80. *A. striatus*.
Scandentes .... 81. *A. scandens*. 82. *A. ramosissimus*.

X. Stirps *A. racemosi*. Flores racemosi. Cladodia subulata vel triquetra.

Cladodia brevia .... 83. *A. nepalensis*. 84. *A. lævissimus*.
Cladodia elongata ...... 85. *A. racemosus*. 86. *A. acerosus*.
87. *A. ascendens*.

XI. Stirps *A. falcati*. Flores racemosi. Cladodia distincte applanata linearia (phyllocladia).

Cladodia solitaria ... 88. *A. sarmentosus*. 89. *A. oxyacanthus*.
Cladodia 1–3na magna .... 90. *A. falcatus*.
Cladodia 3–6na minora .... 91. *A. æthiopicus*.
92. *A. gonoclados*.
93. *A. Curillus*.

§ MYRSIPHYLLUM. Flores hermaphroditi. Cladodia (phyllocladia) lanceolata vel ovata.

Scandentes cladodiis subæqualiter multinervatis.
94. *A. medeoloides*. 95. *A. Krausii*.
Scandens foliis dorso 1-nervatis .... 96. *A. volubilis*.
Suffrutex suberectus .... 97. *A. undulatus*.

1. A. TENUIFOLIUS, *Lam. Encyc.* i. 204; *Red. Lil.* t. 434; *Kunth, Enum.* v. 58; *Reich. Ic. Germ.* t. 969.—A. sylvaticus, *Waldst. et Kit. Hung.* iii. 223, t. 201.—A. officinalis β, *Linn. Sp. Plant.* edit. i. 313. Herba erecta 2–3-pedalis ramis copiosis gracillimis ascendentibus lævibus angulatis. Internodia ramulorum 1–3 lin. longa. Folia basi haud calcarata. Cladodia 10–30 setacea gracillima omnium specierum ascendentia vel subpatentia 6–9 lin. longa. Pedicelli decurvati solitarii vel gemini gracillimi 9–12 lin. longi ad apicem articulati. Flores distincte polygami. Perianthium 2½–3 lin. longum diutine infundibulare segmentis sordide albidis viridi vittatis ½ lin. latis. Stamina perianthio triente vel subduplo breviora, antheris globosis muticis filamento quadruplo brevioribus. Ovula in loculo 2. Bacca globosa splendide rubra 5–6 lin. crassa. *A Gallia et Italia ad Caucasum.* Sapor dulcis. In planta Rossica (A. TENUIFOLIUS, *Led. Flor. Ross.* iv. 196) teste Steven, Taur. 344, baccæ sunt eis *A. officinalis* haud majores.

2. A. OFFICINALIS, *Linn. Fl. Suec.* 108; *Eng. Bot.* t. 339, (edit. 3) t. 1515; *Fl. Dan.* t. 803; *Schk. Handb.* t. 96; *Hayne, Arzne.* viii. t. 29; *Reich. Ic. Fl. Germ.* t. 967.—A. officinalis γ. altilis, *Linn. Sp. Plant.* edit. 1, 313.—A. altilis, *Aschers. in Schwein. Beitr.* 294.—A. hortensis, *Mill. Dict.* no. 1. Herba erecta 2–5-pedalis caule primario recto lævi, ramis multis erecto-patentibus copiose ramulosis, ramulis ascendentibus. Internodia ramulorum 1½–3 lin. longa. Folia basi obscure brevissime calcarata. Cladodia ramulorum 3–6na subulata gracilia brevia ascendentia recta 3–12 lin. longa. Flores distincte polygami. Pedicelli solitarii vel gemini gracillimi arcuati 3–6 lin. longi prope medium articulati. Perianthium masculum 2½–3 lin. longum diutine infundibulare segmentis oblanceolatis. Stamina perianthio triente breviora, antheris oblongis obtusis filamento vix brevioribus. Perianthium fœmineum multo minus, ovulis in loculo binis. Bacca coccinea 3–4 lin. crassa. *Ab Hispania, Anglia et Norvegia ad Algeriam et Songariam, et per zonas ambas temperatas ubique in hortis culta.* Sapor dulcis.—A. PROSTRATUS, *Dumort. Flor. Belg.* 178; *Thielens, Bull. Soc. Belg.* i. 197, t. 2, est forma nana maritima procumbens cladodiis crassis brevibus. Var. SEROTINUS, *Wierz. Reich. Ic. Germ.* t. 968, est forma altera erecta gracilior cladodiis 1½–2 lin. longis. A. OXYCARPUS, *Steven, Taur.* 344, est planta affinis taurica vel caucasica cladodiis eis *A. officinalis* crassioribus strictioribus, baccis apice singulariter cuspidatis. A. POLYPHYLLUS, *Stev. Taur.* 343, in campestribus Tauriæ communis, ab *A. officinali* dicitur differre cladodiis brevioribus, pedicelli articulo superiore perianthio e basi campanulato quadruplo breviore.

3. A. MARITIMUS, *Mill. Dict.* no. 2 (1771), *non Pallas.*—A. officinalis *a*, *Linn. Sp. Plant.* edit. 1, 313.—A. scaber, *Brignol. Fasc. Pl. Forojul.* 92; *Kunth, Enum.* v. 62.—A. amarus, *DC. Hort. Monsp.* 81; *Fl. Franç.* v. 309; *Red. Lil.* t. 446.—A. marinus (*Clus.*), *Reich. Ic.* t. 520. Suffrutex erectus 1–2-pedalis caule striato scabrulo ramis multis firmis ascendentibus angulatis. Internodia ramulorum 2–6 lin. longa. Folia basi deltoidea obscure spinosa. Cladodia ramulorum 3–4, ramorum 6–8, subulata angulata scabrula crassa subrecta cuspidata 3–6 lin. longa ascendentia. Pedicelli 1–2ni, raro 3ni, deflexi, 3–6 lin. longi, supra medium articulati. Flores distincte polygami. Perianthium 2½–3 lin. longum diutine infundibulare segmentis oblanceolatis sordide albidis dorso viridi vittatis. Stamina perianthio triente breviora antheris oblongis mucronatis filamentis dimidio brevioribus. Bacca globosa saturate rubra 3–4 lin. crassa; ovula in loculo gemina. *Regio Mediterranea in maritimis ab Lusitania ad Tauriam et ostiam Danubii.* Sapor amarus.

4. A. BRESLERIANUS, *Schult. Syst.* vii. 323; *Kunth, Enum.* v. 70.—A. verticillatus, *a.* triphyllus, *Bresl. Diss.* no. 27.—A. maritimus,

Pallas, Iter, ii. 239; *Kunth, Enum.* v. 64, *non Miller nec Ledeb.* Suffrutex humilis ramosissimus subpedalis caule primario flexuoso striato scabrido, ramis copiosis firmis divaricatis. Internodia ramulorum 3–6 lin. longa. Folia basi nullo modo calcarata. Cladodia subulata mucronata patentia inæqualia ramulorum sæpissime terna, suprema interdum solitaria 3–6 lin. longa recta robusta. Pedicelli solitarii vel gemini brevissimi ($\frac{1}{2}$–1 lin. longi) apice articulati. Flores distincte polygami. Perianthium $1\frac{1}{2}$ lin. longum diutine infundibulare segmentis oblanceolatis. Stamina perianthio triente breviora, antheris anguste oblongis obtusis filamentis sub dimidio brevioribus. Bacca 3–4 lin. crassa, ovula in loculo gemina. *Persia borealis, Songaria, Turcomania et Siberia occidentalis in desertis salsis.* Sapor amarus.

5. A. OLIGOCLONOS, *Maxim. Fl. Amur.* 287; *Miquel, Ann. Mus. Lug.-Bat.* iii. 151. Herba caule erecto ramis patentibus angulatis striatis scabriusculis ramulis nullis. Folia basi obscure calcarata. Cladodia 6–8na subulata recta patentia 8–9 lin. longa. Flores distincte polygami. Pedicelli gemini decurvati 5–6 lin. longi supra medium articulati. Perianthium masculum $2\frac{1}{2}$–3 lin. longum. Antheræ oblongæ obscure apiculatæ filamentum superantes. *Siberia orientalis in ditione fluminis Amur,* Maximowicz; *et verisimiliter etiam in Japonia,* teste Miquel.

6. A. CASPIUS, *Hohen. Enum. Talusch.* 24; *Schult. Syst.* vii. 322; *Kunth, Enum.* v. 64. Herba elata ramosissima, ramis firmis lævibus gracilibus inferioribus patentibus, ramulis copiosis inferioribus divaricatis. Internodia ramulorum 2–3 lin. longa. Folia basi obscure calcarata. Cladodia firmula subulata ascendentia 4–8na 4–9 lin. longa. Pedicelli gemini 3 lin. longi medio articulati. Flores distincte polygami. Perianthium masculum $2\frac{1}{2}$ lin. longum, diutine infundibulare, segmentis oblanceolatis. Stamina perianthio triente breviora, antheris obtusis filamento paulo brevioribus. Baccæ globosæ paulo minores quam in *A. officinali. Georgia caucasica,* Hohenacker! Inter *officinalem* et *verticillatum* medium tenens.—A. HEDECARPUS, *Andrz. MSS.*, e Podolia australi, est forma vix distinguenda.

7. A. DAVURICUS, *Fisch., Link, Enum. Hort. Ber.* i. 340; *Kunth, Enum.* v. 64; *Led. Ross.* iv. 198; *Turcz. Flor. Baic.* ii. 226. Herba 2–3-pedalis caule primario firmo gracili leviter flexuoso, ramis inferioribus patentibus ramulis copiosis divaricatis vel superioribus ascendentibus. Folia basi obscure brevissime calcarata. Internodia ramulorum 3–6 lin. longa. Cladodia ramulorum 2–6na ascendentia firmula graciliter subulata 6–15 lin. longa longiora sæpe curvata. Flores distincte polygami. Pedicelli gemini 3 lin. longi medio articulati. Perian-

thium masculum 2¼ lin. longum diutine infundibulare, antheris oblongis filamento æquilongis. Bacca 3 lin. crassa. *Dahuria*, Turczaninow! *Mongolia chinensis et terra fluminis Amur*, Maximowicz.—A. GLYCYCARPUS, *Kunth, Enum.* v. 61, planta in Hort. Berol. culta, ex descriptione non potui distinguere nisi cladodiis brevioribus, pedicellis longioribus.—A. GIBBUS, *Bunge, Enum. Chin.* 65, e China boreali, *Bunge*, *Sir G. Staunton*!, *Hance* 12635! est verisimiliter varietas mera cladodiis sæpissime 1–3nis interdum 1–1½ poll. longis, habitu et cladodiis inter *officinalem* et *verticillatum* medium tenens.

8. A. APHYLLUS, *Linn. Sp.* 450; *Mill. Dict.* no. 6; *Sibth. & Sm. Fl. Græc.* t. 338; *Kunth, Enum.* v. 66.—A. phyllacanthus, *Lam. Encyc.* i. 296; *Bresl. Diss.* no. 17. Suffrutex humilis lignosus ramosissimus, ramis et ramulis permultis glabris lignosis strictis distincte multistriatis inferioribus patentibus. Folia infima basi deltoideo-calcarata. Cladodia 1–4na dura rigida ramuliformia apice spinosa 4-angulata inter angulos striata 3–6 vel interdum 9 lin. longa ⅓–½ lin. crassa. Flores polygami. Pedicelli ex axillis 1–2ni ½–1 lin. longi medio articulati. Perianthium 1–1½ lin. longum diutine infundibulare, antheris oblongis filamento bis triente brevioribus. Bacca monosperma 2 lin. crassa. *Regio Mediterranea in locis aridis ab Lusitania ad Græciam.*

Var. STIPULARIS, *Baker.*—A. stipularis, *Forsk. Fl. Ægypt.* 72 (1775); *Kunth, Enum.* v. 68.—A. horridus, *Linn. Suppl.* 203 (1781); *Cav. Ic.* t. 136; *Sibth. & Sm. Fl. Græc.* t. 339; *Red. Lil.* t. 288; *Kunth, Enum.* v. 67.—A. Broussonetii, *Jacq. Ecl.* iii. t. 40; *Kunth, Enum.* v. 67. Habitus altior, ramis et ramulis minus confertis, cladodiis sæpe solitariis strictis 1–1½ poll. longis ½ lin. crassis. *Ab insulis Fortunatis per totam regionem Mediterraneam ad Arabiam petræam*, Major Macdonald! Cum typo per formas intermedias juncta.—A. SQUARROSUS, *Schmidt, Fl. Ins. Cap.* 165, ex insulis Capoverdicis ex descriptione non potui segregare.

Var. BOVEI, *Baker.* Suffrutex gracilior ramis paulo flexuosis, cladodiis tenuioribus longioribus 2–2½ poll. longis ¼ lin. crassis interdum curvatis. *Palæstina ad Gaza*, Bové 389! *Caiffa*, Lowne!

9. A. TRICHOPHYLLUS, *Bunge, Enum.* 65; *Kunth, Enum.* v. 63, *excl.* var. γ. trachyphyllus. Caulis herbaceus lævis sursum distincte flexuosus, ramis et ramulis multis flexuosis ascendentibus. Folia basi haud calcarata. Internodia suprema 1½–3 lin. longa. Cladodia setacea gracillima subulata 3–12 lin. longa erecto-patentia ad ramulos 4–8na, ad ramos interdum 20–30na flexuosa sæpe curvata. Pedicelli gemini gracillimi 3–6 lin. longi prope apicem articulati. Flores distincte polygami. Perianthium diutine infundibulare 1½–2 lin. longum segmentis oblanceolatis. Stamina perianthio triente breviora, an-

theris oblongis apiculatis filamento dimidio brevioribus. Baccæ eis *A. officinalis* paulo minores. *Siberia centralis et China borealis.* Inter *tenuifolium* et *verticillatum* medium tenens cladodiis gracillimis prioris.

10. A. LOWNEI, *Baker.* Herba elata ramosissima subscandens caulibus gracilibus lævibus flexuosis ramis patentibus vel deflexis. Folia basi haud calcarata. Internodia suprema 1–3 lin. longa. Cladodia setacea gracillima debilia subpatentia 9–12 lin. longa ad ramulos 4–8na. Pedicelli gemini arcuati gracillimi 5–6 lin. longi medio articulati. Flores distincte polygami. Perianthium masculum 2½ lin. longum diutine infundibulare, segmentis oblanceolatis. Stamina perianthio triente breviora, antheris oblongis filamentis duplo brevioribus. *Jericho,* Lowne! Habitus *A. verticillati,* cladodiis gracillimis omnium, cum floribus *A. officinalis.*

11. A. VERTICILLATUS, *Linn. Sp. Plant.* 450; *Kunth, Enum.* v. 68; *Led. Ross.* iv. 199.—A. verticillaris, *Lam. Encyc.* i. 297.—A. tricarinatus, *DC. in Red. Lil.* t. 451. Suffrutex 3–6-pedalis subscandens ramosissimus caulibus lævibus firmis flexuosis ramis et ramulis inferioribus divaricatis vel deflexis. Folia infima basi deltoideo-calcarata. Internodia suprema 2–3 lin. longa. Cladodia ramulorum 3–6na, ramorum interdum dense congesta (10–20 in fasciculo) firma modice crassa angulata vel obscure compressa sæpe divaricata 6–12 lin. longa. Pedicelli 1–2ni interdum 3–4ni, ½–2 lin. longi ad vel supra medium articulati. Flores distincte polygami. Perianthium diutine infundibulare 1–2 lin. longum. Antheræ oblongæ filamento subæquilongæ. Baccæ 2–2½ lin. crassæ. Ovula in loculo gemina. *Bessarabia, Dobrudscha, Tauria, Persia, Caucasus, Siberia occidentalis et centralis.*—A. COLLINUS, *Schur. Transyl.* 650, est planta affinis e Transylvania mihi non visa.

Var. FLORIBUNDUS, *Baker,* est forma cladodiis ramulorum sæpe solitariis triquetris 5–6 lin. longis, floribus copiosissimis, pedicellis sæpe 3–4nis; *Bessarabia,* Tardent!

12. A. ACUTIFOLIUS, *Linn. Sp. Plant.* edit. ii. 449; *Mill. Dict.* no. 3; *Sibth. & Sm. Fl. Græc.* t. 337; *Bresl. Diss.* no. 16; *Duham. Arbr.* t. 31; *Kunth, Enum.* v. 65; *Godr. Fl. Franc.* iii. 232.—A. Corruda, *Scop. Carn.* i. 248. Suffrutex elatus ramosissimus ramulis strictis firmis distincte striatis glabris vel pubescentibus inferioribus patentibus vel leviter deflexis. Folia basi deltoideo-calcarata. Internodia ramulorum 1–2 lin. longa. Cladodia stricta subulata mucronata divaricata 1½–3 lin. longa distincte canaliculata ad nodos 4–12na. Flores distincte polygami. Pedicelli solitarii vel gemini 2–3 lin. longi supra medium articulati. Perianthium 1–1½ lin. longum diutine infundibulare, segmentis oblanceolatis. Stamina perianthio triente

breviora antheris oblongis obtusis filamento bis triente brevioribus. Bacca monosperma 2–2½ lin. crassa. *Per regionem Mediterraneam totam ab insulis Fortunatis et Lusitania ad Syriam et Bithyniam.* Formæ tres orientales ab typo recedunt:—1. GRACILIS (*Libanus*, Aucher Eloy 2686!) ad *A. palæstinum* cladodiis gracilioribus minus striatis 2 lin. longis; 2. ORIENTALIS (*Paros*, Prof. E. Forbes! *Palæstina ad cacumen montis Tabor*, Bromfield!) ad *A. aphyllum* cladodiis 2–6nis apice conspicue spinosis crassioribus longioribus (3–5 lin. longis, ¼ lin. crassis); et 3. HOOKERI (*Smyrna*, Hooker & Hanbury!) cladodiis 6–12nis 3–4 lin. longis ¼ lin. crassis cuspidatis floribus majoribus, perianthio masculo 2 lin. longo. Tabulas formarum Italicarum (A. ÆTNENSIS, BREVIFOLIUS, et INARIMENSIS, *Tornabene*) in Atti Gioen. ii. t. 12, non vidi.

13. A. BRACHYPHYLLUS, *Turcz. Mosc. Bull.* 1840, 78.—A. trichophyllus, var. trachyphyllus, *Kunth, Enum.* v. 63.—A. purpurascens, *M. Bieb. MSS.*—A. Tauscheri, *Fisch. MSS.*—A. officinalis, var. flexuosus, *Ledeb. Fl. Alt.* ii. 43. Herba subpedalis caule primario distincte flexuoso, ramis et ramulis multis gracillimis lævibus flexuosis sæpe deflexis arcuatis. Internodia suprema 1–2 lin. longa. Folia basi obscure deltoideo-calcarata. Cladodia 4–8na subulata modice crassa ascendentia 1½–2 lin. longa. Pedicelli solitarii vel gemini 2–3 lin. longi supra medium articulati. Flores distincte polygami. Perianthium diutine infundibulare 1½–2 lin. longum segmentis oblanceolatis. Stamina perianthio paulo breviora, antheris oblongis filamento paulo brevioribus. *Sarepta*, Besser; *Songaria chinensis*; *Dobrudscha*, Sintenis! Turczaninow et C. A. Meyer!

14. A. BREVIFOLIUS, *Boiss. in Bourgeau, Plant. Lyciæ*, 1860, *Exsic.* Suffrutex elatus ramosissimus subscandens habitu *A. verticillati* ramis firmis flexuosis angulatis striatis inferioribus patentibus vel reflexis. Internodia suprema 1–3 lin. longa. Folia infima basi obscure deltoideo-calcarata. Cladodia ramulorum 6–8na subulata firma pallide viridia recta 1–2 lin. longa ascendentia. Pedicelli ex axillis solitarii vel gemini demum 4–4½ lin. longi supra medium articulati. Flores distincte polygami. Perianthium fœmineum solum vidi, 2 lin. longum, segmentis oblanceolatis. Bacca globosa 3 lin. crassa. *Lycia in arvis incultis ad Elmalu*, Bourgeau!

15. A. PALÆSTINUS, *Baker.* Herba elata ramosissima caule lævi firmo gracili flexuoso, ramis et ramulis inferioribus distincte reflexis. Internodia suprema 1–2 lin. longa. Folia basi haud calcarata. Cladodia 3–8na ascendentia curvata firmula subulata 3–6 lin. longa. Pedicelli 3–4 lin. longi infra medium articulati. Perianthium masculum 2–2½ lin. longum diutine infundibulare. Flores distincte polygami. Stamina perianthio triente breviora, antheris oblongis apicu-

latis filamento æquilongis. Baccas non vidi. *Palæstina ad Huleh et ad vada fluminis Jordan*, Hayne!

16. A. LITTORALIS, *Stev. Taur.* 344.—A. maritimus, *Led. Ic.* t. 393. Caulis 2–5-pedalis deorsum lignosus lævis vetustate decorticatus sursum flexuosus ramis multis flexuosis ascendentibus ramulis divaricatis. Folia infima basi deltoideo-calcarata. Internodia suprema 3–6 lin. longa. Cladodia ramulorum 2–4na ascendentia modice firma et crassa valde inæqualia 6–18 lin. longa. Pedicelli gemini 3–4 lin. longi supra medium articulati. Flores distincte polygami. Perianthium diutine infundibulare 2–2½ lin. longum, segmentis oblanceolatis. Antheræ oblongæ apiculatæ filamento paulo breviores. Bacca 3 lin. crassa. *Tauria*, Steven; *Persia borealis*, Aucher Eloy 5360! *in deserto Kerghisorum*, Becker! Inter *maritimum* et *verticillatum* medium tenens, et forma affinis adest a Pallasio sub nomine *A. maritimi* ad Herb. Kew. missum habitu humiliore ramis inferioribus distincte reflexis.

17. A. FILIFOLIUS, *Bert. Misc.* i. 20 (1842); *Walp. Ann.* i. 872; *Kunth, Enum.* v. 851.—A. euphraticus, *Kunth, Enum.* v. 73 (1850). Herba elata caulibus firmis gracilibus lævibus leviter flexuosis ramis multis virgatis inferioribus distincte reflexis. Internodia ramulorum 3–12 lin. longa. Folia basi haud calcarata. Cladodia crassitie eorum *A. officinalis* omnia solitaria ascendentia 6–12 lin. longa. Pedicelli 1–2ni 1–1½ lin. longi supra medium articulati. Flores distincte polygami. Perianthium masculum diutine infundibulare 1½–2 lin. longum. Segmentis oblanceolatis, basi in capsulo perspicuo connatis. Stamina perianthio distincte breviora, antheris oblongis obtusis filamento sub dimidio brevioribus. *Ad ripas fluminis Euphratæ*, Chesney 105, ex parte!

18. A. PERSICUS, *Baker*. Herba elata ramosissima subscandens caulibus firmis lævibus flexuosis ramis virgatis inferioribus distincte deflexis. Internodia suprema 2–3 lin. longa. Folia basi haud calcarata. Cladodia 1–4na, raro 5–6na, subulata firmula inæqualia crassitie eis *A. officinalis* ascendentia 6–12 lin. longa. Pedicelli ex axillis 1–2ni raro 3–4ni, fructiferi 5–6 lin. longi supra medium articulati. Perianthium diutine infundibulare, masculum 3 lin. longum, fœmineum duplo minus. Antheræ oblongæ 1 lin. longæ filamentis æquilongæ. Baccæ 3 lin. crassæ. *Persia borealis ad radices montis Demavend prope pagum Ask*, Kotschy 365!

19. A. CHESNEYI, *Baker*. Herba elata caulibus firmis gracilibus teretibus lævibus subscandentibus, ramis multis virgatis inferioribus distincte reflexis. Internodia ramulorum 3–6 lin. longa. Folia basi haud calcarata. Cladodia subulata crassitie eorum *A. officinalis* 3–5na arcuato-ascendentia 6–15 lin. longa. Flores distincte polygami ex axillis solitarii vel gemini. Perianthium fœmineum solum vidi,

diutine infundibulare 1 lin. longum, pedicellis gracillimis 1½–3 lin. longis medio articulatis. *Ad ripas fluminis Euphratæ,* Chesney 105, ex parte!

20. A. OLIGOPHYLLUS, *Baker.* Herba elata ramosissima caulibus lævibus firmis obscure striatis, ramis flexuosis, ramulis infimis valde deflexis. Folia basi haud calcarata. Internodia suprema 2–3 lin. longa. Cladodia 1–4na eis *A. officinalis* crassiora subulata ascendentia canaliculata inæqualia mucronata 3–9 lin. longa. Pedicelli gemini decurvati 4–5 lin. longi supra medium articulati. Flores distincte polygami. Perianthium masculum 2 lin. longum diutine infundibulare. Stamina perianthio triente breviora antheris oblongis filamento æquilongis. *Astrachan,* Prescott in Herb. Bentham.! et planta similis a *Songaria,* Schrenck! sub nomine *A. trichophylli,* var. *flexuosi,* Traut. ex Herb. Hort. Petrop. missa, cladodiis gracilioribus brevioribus pedicellis fructiferis 7–8 lin. longis baccis 2–2½ lin. crassis.

21. A. MONOPHYLLUS, *Baker.* Suffrutex elatus subscandens ramosissimus caule primario tereti lævi flexuoso ramulis ultimis valde reflexis. Folia basi deltoideo-cuspidata. Internodia suprema 1–2 lin. longa. Cladodia solitaria vel ad apices ramorum bina irregulariter patentia firmula curvata 9–18 lin. longa eis *A. officinalis* crassiora canaliculata vel obscure compressa. Flores polygami ex axillis copiosis 1–2ni. Pedicelli 1–1½ lin. longi medio articulati. Perianthium fœmineum 1½ lin. longum, masculum non vidi. Baccæ 2 lin. crassæ. *Beloochistan superior,* Stocks 1114 ex parte!

22. A. GRIFFITHII, *Baker.* Suffrutex elatus ramosissimus caulibus primariis lævibus teretibus, ramis elongatis flexuosis ramulis inferioribus valde deflexis. Internodia suprema 1½–3 lin. longa. Folia basi haud calcarata. Cladodia 1–4na ascendentia 3–6 lin. longa, subulata eis *officinalis* crassiora canaliculata vel obscure compressa. Flores polygami. Pedicelli ex axillis solitarii vel gemini 4–6 lin. longi supra medium articulati. Perianthium fœmineum 1½ lin. longum, masculum non vidi. Bacca 2–2½ lin. crassa. *Afghanistan ad Topchee,* Griffith, 5856!

23. A. SCHOBERIOIDES, *Kunth, Enum.* v. 70; *Miquel, Ann. Mus. Lug.-Bat.* iii. 151.—A Wrightii, *A. Gray, Bot. Jap.* 403.—A micranthus, *Sieb. et Zucc. non Lindl.*—A. Sieboldi, *Maxim. Prim. Amur.* 287.—A. parviflorus, *Turcz. Fl. Baic. Dahur.* ii. 226. Herba ramosissima erecta 3–4-pedalis caulibus angulatis sulcatis, ramis et ramulis gracillimis debilibus ascendentibus. Folia basi haud calcarata. Internodia suprema 1–2 lin. longa. Phyllocladia 2–6na linearia falcata plana 3–6 lin. longa, ¼–⅓ lin. lata ad apicem angustata costa lata prominula. Flores distincte polygami. Pedicelli axillares 1–2, raro 3–4ni brevissimi vel subnulli summo apice articulati. Perianthium ¾–1 lin. lon-

gum, diutine campanulatum. Antheræ minutissimæ orbiculatæ filamento dodrante breviores. Baccæ monospermæ 3 lin. crassæ. *Japonia*, C. Wright! Buerger! *Sachalin*, F. Schmidt! *Siberia orientalis in ditione fluminis Amur*, Maximowicz! *Davuria*, Turcznaninow. (Exemplum in Zollinger, Pl. Jav. No. 112, est japonicum.)

24. A. FILICINUS, *Hamilt. in D. Don, Prodr. Nep.* 49; *Kunth, Enum.* v. 73. Herba alta ramosissima caulibus cavis lævibus interdum leviter flexuosis, ramis infimis patentibus. Folia basi haud calcarata. Internodia suprema 1–2 lin. longa. Phyllocladia 2–5na linearia curvata plana unicostata acuta 3–4 lin. longa, ½ lin. lata. Pedicelli gracillimi geminati 6–9 lin. longi, medio articulati. Flores polygami. Perianthium 1–1½ lin. longum, diutine infundibulare. Stamina perianthio triente breviora antheris minutis filamento ½–⅔ brevioribus. Bacca 2 lin. crassa. *Himalayæ occidentalis et centralis regio temperata*, Thomson! Falconer 1109! Strachey & Winterbottom! &c.

Var. BREVIPES, *Baker*. Rami magis flexuosi. Phyllocladia 3–4 lin. longa, ⅙–¼ lin. lata. Pedicelli brevissimi. *Khasia*, Griffith 5863! Hook. fil. & Thomson! *Poneshee*, D. J. Anderson! *Assam*, Griffith!

Var. BREVIFOLIUS, *Baker*. Internodia brevissima. Phyllocladia 1½–2 lin. longa, falcata ⅓ lin. lata. *Khasia, at Syong*, 5000–6000 *pedes*, Hook. fil. & Thomson!

Var. LYCOPODINEUS, *Baker*.—A. lycopodineus, *Wall. MSS.*—A Curillus, *Wall. Cat.* 5155 E, *non Roxb.* Phyllocladia 1–3na, 3–4 lin. longa, ½ lin. lata. Flores non vidi. *Ava ad montes Taongdong*, Wallich! *Mishmi*, Griffith 5854! *Birma*, Parish!

25. A. LUCIDUS, *Lindl. Bot. Reg.* 1844, *Misc.* No. 36; *Benth. Fl. Hong.* 371; *Miquel, Ann. Mus. Lug.-Bat.* iii. 151; *Kunth, Enum.* v. 72.—A. falcatus, *Thunb. Jap.* 139, *non Linn.*—A. insularis, *Hance, Ann. Sc. Nat.* sér. 5, v. 245. Suffrutex ramosissimus subscandens caulibus lævibus distincte multisulcatis, ramis flexuosis ascendentibus vel deflexis. Folia basi breviter spinoso-calcarata (calcari majorum 1½–2 lin. longo). Internodia suprema 1–2 lin. longa. Phyllocladia 2–4na vel ad apices ramulorum 6na, linearia plana divaricata arcuata 6–12 lin. longa, ⅓–½ lin. lata, firmula nitidula unicostata ad apicem angustata. Flores polygami, copiosi. Pedicelli 1–2ni, interdum 3–4ni, 1½–2 lin. longi, medio articulati. Perianthium 1–1½ lin. longum, diutine campanulatum. Antheræ minutissimæ orbiculatæ filamento 3–4plo breviores. Bacca monosperma 3 lin. crassa. *Japonia*, C. Wright! Oldham 880! *Korea*, Wilford 696! Oldham 881! *Amoy*, Swinhoe! *Hongkong*, C. Wright! Hinds! *Macao*, Sir G. Staunton! Nelson! *Formosa*, Oldham 568! 569!

26. A. GAUDICHAUDIANUS, *Kunth, Enum.* v. 71. Suffrutex scandens ramis lignosis gracillimis angulatis lævibus striatis, ramulis inferiori-

bus distincte reflexis. Folia infima in spinas duras subulatas 2–3 lin. longas producta. Phyllocladia 1–3na ensiformia curvata rigidula plana $1\frac{1}{2}$–2 poll. longa, 1–$1\frac{1}{4}$ lin. lata, costa ad faciem inferiorem prominula. Pedicelli umbellati 1 lin. longi, medio articulati. Flores polygami. Perianthium 1–$1\frac{1}{2}$ lin. longum, antheris minutissimis filamento 3–4plo brevioribus. *Cochin-China*, Gaudichaud! (Vidi in hb. DC.)

27. A. CUSCUTOIDES, *Burchell, MSS*. Herba debilis volubilis intricate ramosissima habitu *Cuscutæ* ramis et ramulis filiformibus lævibus deflexis glabris flexuosis. Folia basi haud calcarata. Cladodia nulla. Flores hermaphroditi, e latere ramulorum solitarii pedicellis curvatis $1\frac{1}{2}$–2 lin. longis, summo apice articulatis. Perianthium 1–$1\frac{1}{2}$ lin. longum, segmentis diutine persistentibus. Antheræ oblongæ filamento triplo breviores. Bacca globosa 2 lin. crassa. *Caput Bonæ Spei, in saxosis aridis ad ripas fluminis Gariep*, Burchell 2673!

28. A. DENUDATUS, *Baker*.—Asparagopsis denudata, *Kunth, Enum*. v. 82. Suffrutex altus ramosissimus ramis primariis firmis obtuse angulatis pallide viridibus lævibus glabris vix lignosis, ramis parum flexuosis, ramulis flagelliformibus nudis firmis curvatis. Folia infima basi calcari obscuro ad ramum adpresso prædita. Cladodia omnino obsoleta. Flores hermaphroditi, ex apice ramulorum vel raro e nodis lateralibus 1–4ni, pedicellis 1 lin. longis, prope basin articulatis. Perianthium 1 lin. longum, diutine campanulatum. Antheræ oblongæ filamento triplo breviores. Baccæ 2 lin. crassæ. *Caput Bonæ Spei*, Drège 3533! Zeyher, Aspar. 29!

Var. FRAGILIS, *Baker*.—Asparagus fragilis, *Burchell, MSS*. Cladodia 1–2 minutissima subulata ad nodos ramulorum interdum producta. *C. B. Spei*, Burchell 2758!

29. A. VIRGATUS, *Baker in Saund. Ref. Bot*. t. 214. Suffrutex erectus ramosissimus 2–6-pedalis, caule primario viridi glabro angulato sulcato gracili haud lignoso, ramis et ramulis multis virgatis angulatis firmulis gracillimis ascendentibus. Folia basi haud calcarata. Internodia ramulorum 2–4 lin. longa. Cladodia 1–3na ascendentia recta firmula 1–4 lin. longa, angulata, sæpe abortiva. Flores hermaphroditi, ex axillis solitarii vel gemini, pedicellis 2–3 lin. longis, infra medium articulatis. Perianthium $1\frac{1}{2}$ lin. longum, segmentis flore expanso late patentibus, antheris oblongis filamento 3–4plo brevioribus. Bacca monosperma 2 lin. crassa. *Cap B. Spei*, Burchell 3197! Drège 4483! Mrs. Barber 269! MacOwan 1918! Ecklon & Zeyher Smil. 28! *Natal*, Krauss 356! Cooper 2248! Gerrard & M'Ken 755!

Var. CAPILLARIS, *Baker*. Internodia breviora, cladodiis 3–4 lin. longis, erecto-patentibus e nodis plerisque productis. *Kaffaria*, Cooper 202! Forma habitu ab typo dissimilis, sed characteres certos nullos inveni.

30. A. CAPITATUS, *Baker*. Suffrutex gracilis ramosissimus subscandens, ramis firmis gracillimis striatis, ramulis inferioribus distincte deflexis. Folia basi deltoideo-calcarata calcari firmo subspinoso. Internodia suprema 2–6 lin. longa. Cladodia setacea ascendentia firma cuspidata 1–3na, 1–4 lin. longa. Pedicelli ad apices ramulorum capitate 1–4ni, 1–1½ lin. longi, infra medium articulati. Flores hermaphroditi. Perianthium 1½ lin. longum, segmentis flore expanso late patentibus. Stamina perianthio subduplo breviora, antheris minutissimis filamento 3–4plo brevioribus. Bacca monosperma 2 lin. crassa. *Beloochistan ad Kishan*, Stocks 1114, ex parte! *Punjaub ad Rotas*, Vicary! *et Rawul Pindee*, Aitchison 1222! An sit varietas campestris *A. gracilis*?

31. A. CRISPUS, *Lam. Ency.* i. 295; *Bresl. Diss.* no. 22; *Kunth, Enum.* v. 73 *non Bojer*.—A. decumbens, *Jacq. Hort. Schoen.* i. 71, t. 97; *Bresl. Diss.* No. 21; *Schult. fil. Syst.* vii. 326.—Asparagopsis decumbens, *Kunth, Enum.* v. 77.—Asparagus flexuosus, *Thunb. Prod.* 66; *Fl. Cap.* 333; *Kunth, Enum.* v. 74.—Medeola triphylla, *Thibaud in herb. DC.*—Asparagus sinensis, *Hort. Noisette.*—Herba late volubilis caulibus gracillimis lævibus glabris, ramis et ramulis deflexis valde flexuosis junioribus cladodiis nullis productis. Folia basi haud calcarata. Internodia suprema ½–1 lin. longa. Cladodia 2–3na, 2–3 lin. longa, angulata vel obscure compressa ⅔ lin. lata flaccida recta vel falcata. Flores hermaphroditi ex axillis solitarii, pedicellis cernuis 3–5 lin. longis. Perianthium 2½ lin. longum, segmentis ligulatis flore expanso ad medium falcatis. Antheræ globosæ minutissimæ filamento 5–6plo breviores. Ovula in loculis 5–6. Bacca 4–6 lin. crassa, sæpe 3–4-sperma, stylo persistente coronata. *Caput Bonæ Spei*, Thunberg! Ecklon & Zeyher 76! C. Wright 455! Villette! Cooper 3254; 3252! (non *Mauritius*, ut dicit Lamarck). Sæpe in hortis culta.

32. A. GRACILIS, *Royle, Ill. Him.* i. 393 (*nomen solum*) *teste Edgeworth*. Suffrutex elatus caulibus primariis teretibus gracilibus lævibus, ramis et ramulis copiosis strictis infimis divaricatis vel deflexis. Folia inferiora basi distincte deltoideo-calcarata subspinosa. Internodia suprema 2–3 lin. longa. Cladodia gracillima setacea stricta ascendentia, 3–6 raro 8–9 lin. longa, ad ramulos 3–6na, ad ramos interdum magis congesta. Pedicelli ex axillis gemini, ex apice ramulorum sæpe 3–4ni, 1–2 lin. longi ad vel infra medium articulati. Flores hermaphroditi. Perianthium 1 lin. longum, segmentis flore expanso late patentibus. Antheræ minutissimæ oblongæ filamento 3–4plo breviores. *Himalaya occidentalis, Punjaub, Garwhal, Kumaon, &c., alt.* 1000–3000 *pedes*, Thomson! (Hk. fil. & Thom. *Asparagus* No. 4), Edgeworth 136! Jacquemont 605! *Neilgherries*, Gardner! Wight 2817!

33. A. BURKEI, *Baker*. Suffrutex erectus ramosissimus caulibus pri-

mariis teretibus vix lignosis glabris pallide viridibus, flexuosis, ramis et ramulis multis strictis duris patentibus apice subpungentibus. Folia infima basi obscure calcarata. Internodia suprema ½–1 lin. longa. Cladodia subulata 1½–5 lin. longa, valde inæqualia pallide viridia gracillima flexuosa ad nodos axillares 1–6na, ad ramos dense fasciculata. Flores hermaphroditi, e nodis sæpissime 1–2nis, interdum 3–4nis, pedicellis ½–1 lin. longis, supra basin articulatis. Perianthium ¾–1 lin. longum, segmentis flore expanso late patentibus. Antheræ oblongæ filamento triplo breviores. Bacca 2 lin. crassa. *Cap. B. Spei, ad ripas fluviorum Gamka et Crocodile,* Burke !

34. A. NODOSUS, *Solander in herb. Banks.* Suffrutex erectus ramis strictis pallidis dense pubescentibus ramulis erecto-patentibus. Folia basi haud calcarata. Internodia suprema 1½–2 lin. longa. Cladodia subulata 1–2 lin. longa, crassitie eorum *A. asiatici* ad nodos axillares 6–10na, ad ramos dense fasciculata. Flores hermaphroditi, ex axillis 2–4ni pedicellis brevissimis flore æquilongis. Perianthium minutissimum omnium ½ lin. longum. Antheræ oblongæ, filamento multo breviores. *Caput Bonæ Spei,* Masson ! in herb. Mus. Brit.

35. A. EXUVIALIS, *Burchell, Travels,* i. 432 ; *Bresl. Diss.* no. 40 ; *Schult. fil. Syst.* vii. 337 ; *Kunth, Enum.* v. 74. Suffrutex subscandens ramosissimus caulibus primariis lignosis teretibus lævibus epidermide albida cito secedente, ramulis valde flexuosis gracillimis infimis deflexis. Folia basi haud calcarata. Internodia suprema 2–3 lin. longa. Cladodia 2–6na ascendentia vel patentia subulata pallide viridia recta tenuia 3–6 lin. longa. Flores hermaphroditi ex axillis gemini pedicellis cernuis 1 lin. longis apice articulatis. Perianthium 1–1½ lin. longum, segmentis diutine ascendentibus. Stamina perianthio triente breviora, antheris minutis oblongis filamento bis triente brevioribus. *Caput Bonæ Spei,* Burchell 1768 ! 1854 ! 2566 ! Zeyher 607 ! 4157 ! Baines !

36. A. DUMOSUS, *Baker.* Suffrutex ramosissimus bipedalis caulibus primariis lignosis junioribus flexuosis dense ramosis ramulis distincte multistriatis pallidis glabris infimis divaricatis vel leviter reflexis. Internodia suprema 2–3 lin. longa. Folia basi distincte deltoideo-cuspidata juniora apice spinosa. Cladodia ramulorum 3–8na ad ramos lignosos dense congesta subulata firma crassa ascendentia cuspidata angulata distincte canaliculata 2–4 lin. longa. Flores hermaphroditi ex axillis 1–4ni. Pedicelli erecto-patentes 1½ lin. longi, infra medium articulati. Perianthium diutine infundibulare 1½ lin. longum, segmentis oblanceolatis. Antheræ minutissimæ subglobosæ filamentis 3–4plo breviores. Baccæ 2 lin. crassæ. *Scinde in dumetis prope Kurrachee,* Stocks 441 ! Dalzell 59 !

37. A. SIMULANS, *Baker*. Suffrutex subscandens ramosissimus ramis gracillimis teretibus striatulis, ramulis ultimis angulatis flexuosis. Folia basi haud calcarata. Internodia ramulorum $1\frac{1}{2}$–3 lin. longa. Cladodia lateralia 2–3na, ad apices ramulorum 3–6na, ascendentia valde falcata subulata conspicue angulata 6–8 lin. longa, $\frac{1}{3}$–$\frac{1}{4}$ lin. crassa nitide viridia. Flores hermaphroditi. Pedicelli ex axillis solitarii vel gemini 2–$2\frac{3}{4}$ lin. longi, supra basin articulati. Perianthium $1\frac{1}{2}$ lin. longum, segmentis late patentibus. Antheræ oblongæ filamento 3–4plo breviores. *Madagascaria*, Gerrard 66! Cladodia omnino *A. racemosi.*

38. A. DECLINATUS, *L. Sp.* 449; *Lam. Ency.* i. 294; *Miller, Dict.* No. 7; *Thunb. Prod.* 66; *Bresl. Diss.* no. 32; *Kunth, Enum.* v. 59. —Asparagopsis setacea, *Kunth, Enum.* v. 82. Suffrutex altus ramosissimus subscandens ramis teretibus vix lignosis striatis pallide viridibus, ramulis infimis sæpe deflexis. Folia infima haud vel obscure calcarata. Internodia suprema 2–3 lin. longa. Cladodia lateralia 6–10 vel ad apices ramorum 10–20 vel plura subulata viridia gracillima sæpe patentia recta vel leviter curvata 6–8 lin. longa. Flores hermaphroditi, ex nodis lateralibus 1–2ni ex apice ramorum 3–4ni, pedicellis 2–3 lin. longis medio articulatis. Perianthium 1–$1\frac{1}{2}$ lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento triplo breviores. Baccæ 2 lin. crassæ. *Caput Bonæ Spei*, Thunberg! Drège 8584 *b*! *c*! Zeyher, *Asparagus* No. 3! MacOwan 1917! Cooper 1127! 3497! E. & Z. Smilac. 23!

39. A. ARBORESCENS, *Willd. Herb.* 6686; *Schult. fil. Syst.* vii. 337; *Webb et Berth. Phyt. Can.* iii. 328, t. 228.—Asparagus equisetifolius, *Webb in Bourg. Pl. Can. Exsic.* no. 212.—Asparagopsis arborescens, *Kunth, Enum.* v. 79.—Suffrutex erectus ramis lignosis griseis lævibus, ramulis strictis lignosis plus minus ascendentibus. Internodia suprema 1–2 lin. longa. Folia basi obscure deltoideo-calcarata. Cladodia 1–4na subulata compressa ascendentia stricta 1–3 poll. longa, distincte sulcata. Flores hermaphroditi. Pedicelli 2–4ni, 2–3 lin. longi medio articulati. Perianthium $1\frac{1}{2}$ lin. longum diutine infundibulare, antheris oblongis minutis filamento 3–4plo brevioribus. Ovula in loculo 3–4. Bacca 2 lin. crassa. *Insulæ Canarienses in rupestribus aridissimis,* Broussonet! Ledru! Bourgeau 212!

40. A. MACOWANI, *Baker*. Suffrutex erectus caulibus primariis gracilibus lævibus lignosis pallidis canaliculatis, ramulis gracillimis ascendentibus. Folia basi obscure calcarata. Internodia suprema 2–3 lin. longa. Cladodia 20–30na ascendentia curvata subulata gracillima 4–6 lin. longa. Flores geminati hermaphroditi. Pedicelli cladodiis paulo breviores gracillimi 3–4 lin. longi, articulo invisibili. Peri-

anthium 1 lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento triplo breviores. *C. B. S. prope Albany*, Zeyher 879! *In sylvis ad latera montis Boschberg*, MacOwan 1917!

41. A. FŒNICULACEUS, *Lowe, Linn. Journ.* v. 44. Suffrutex elatus caulibus primariis teretibus lignosis lævibus ramis ultimis virgatis patentibus. Internodia suprema 1–2 lin. longa. Folia basi nullo modo calcarata. Cladodia 3–6na ascendentia curvata setacea 6–9 lin. longa. Internodia florifera sæpe aphylla. Pedicelli 2–4ni, 2–2½ lin. longi, infra medium articulati. Flores hermaphroditi. Perianthium diutine infundibulare, 1½ lin. longum, segmentis oblanceolatis, antheris oblongis filamento duplo brevioribus. *Mauritania prope Mogadore*, Schousboe! Lowe!

42. A. PILOSUS, *Baker*. Suffrutex scandens ramis flagelliformibus gracillimis curvatis dense pilosis. Folia basi haud calcarata. Internodia suprema 1–3 lin. longa. Cladodia 1½–3 lin. longa, ascendentia firmula subulata gracillima 3–8na ad nodos floriferos sæpe reducta vel abortiva. Flores hermaphroditi, e nodis pluribus 2–6na, pedicellis 1½–2 lin. longis medio articulatis. Perianthium 1 lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento 3–4plo breviores. *Africa tropicalis austro-centralis in ditione laci Nyami*, Maccabe!

43. A. MULTIFLORUS, *Baker*. Suffrutex subscandens ramis pallide viridibus teretibus pubescentibus, ramulis ultimis strictis duris deflexis. Folia infima basi obscure calcarata. Internodia suprema ½–1 lin. longa. Cladodia subulata crassa rigida mucronata 2–3 lin. longa, canaliculata ascendentia vel deflexa vel patentia ad nodos 6–12na. Flores hermaphroditi, ex nodis omnibus dense umbellati, pedicellis 2–2½ lin. longis, infra medium articulatis. Perianthium 1¼ lin. longum, segmentis flore expanso late patentibus. Antheræ oblongæ filamento 3–4plo breviores. *Cap. B. Spei in ditione Somerset*, Bowker!

44. A. SCOPARIUS, *Lowe, Prim. Mad.* 11; *Kunth, Enum.* iv. 74; *Webb et Berth. Phyt. Can.* iii. t. 226.—A. exaltatus, *C. Smith in Herb. Banks.*—A. plocamoides, *Webb in Steud. Nomen.* 150.—A. altissimus, *Munby, Bull. Soc. Bot. France*, ii. 287; *Walp. Ann.* vi. 142. Suffrutex ramosissimus 6–18-pedalis, ramis firmis gracilibus teretibus lævibus subscandentibus, ramulis ultimis multis brevibus deflexis. Folia basi haud calcarata. Internodia ramulorum 2–6 lin. longa. Cladodia firmula subulata ascendentia 3–6 lin. longa, ad nodos laterales 4–8na, ad apices ramulorum interdum 12–15na. Pedicelli 1½–2 lin. longi, infra medium articulati, ad nodos axillares 2–6ni, ad apices ramulorum 10–20ni. Flores hermaphroditi. Perianthium infundibulare 1½

lin. longum, segmentis oblanceolatis. Stamina perianthio triente breviora, antheris oblongis purpureis filamento 3–4plo brevioribus. Baccæ 2–2½ lin. crassæ. *Algeria prope Oran,* Durando! *Insulæ Canarienses,* Broussonet! Webb! Bourgeau 211! *Madeira,* Lowe! Lemann! *Insulæ capo-verdicæ,* T. Vogel! Dr. Hooker! Moseley!

45. A. UMBELLATUS, *Link in Buch, Can.* 140; *Schult. fil. Syst.* vii. 324; *Webb et Berth. Phyt. Can.* iii. 327, t. 227.—Asparagopsis umbellata, *Kunth, Enum.* v. 79.—A grandiflorus, *Willd. MSS.*; *Bresl. Diss.* no. 23.—Asparagopsis grandiflora, *Kunth, Enum.* v. 80. Suffrutex elatus ramosissimus subscandens ramis gracilibus angulatis multistriatis scabridis, ramis et ramulis inferioribus valde deflexis. Folia basi obscure deltoideo-calcarata. Internodia suprema 1–3 lin. longa. Cladodia 3–6 lin. longa, rigida divaricata triquetra vel obscure compressa, ramorum 3–8na, sed ad apices ramulorum sæpe 10–20na. Flores hermaphroditi. Pedicelli ad axillas dense umbellati 3–6 lin. longi infra medium articulati. Perianthium diutine campanulatum 2½–3 lin. longum, segmentis ¾–1 lin. latis. Antheræ minutæ oblongæ filamento quadruplo breviores. Ovula in loculo plura. Bacca 3 lin. crassa. *Insulæ Canarienses,* C. Smith! Broussonet! Bourgeau 447! 1536!

Var. SCABER, *Baker.*—Asparagus scaber, *Lowe, Prim. Mader.* 11.—Asparagopsis Lowei, *Kunth, Enum.* v. 74. Cladodia longiora (sæpe 6–9 lin. longa) tenuiora. Pedicelli ex axillis gemini, sed ad apices ramulorum 4–6ni, demum 5–6 lin. longi, medio articulati. *Madeira,* Masson! Lemann! Mandon 242! &c.

46. A. ROTTLERI, *Baker.*—A. floribundus, *Rottler, Herb.,* non Asparagopsis floribunda, *Kunth.* Suffrutex elatus ramis firmis teretibus multisulcatis scabridis, ramulis distincte reflexis. Folia basi nullo modo calcarata. Internodia ramulorum 3–6 lin. longa. Cladodia 3–6na ascendentia curvata firmula 1–1½ poll. longa, eis *officinalis* paulo crassiora canaliculata. Flores hermaphroditi. Pedicelli 2 lin. longi, infra medium articulati, dense umbellati. Perianthium 1½ lin. longum, diutine infundibulare. Antheræ minutissimæ filamentis 3–4plo breviores. Baccas non vidi. *India peninsularis,* Rottler!

47. A. UMBELLULATUS, *Sieb. Herb. Maur.* no. 150; *Bresl. Diss.* no. 24; *Schult. fil. Syst.* vii. 324.—Asparagopsis umbellulata, *Kunth, Enum.* v. 81.—Asparagus crispus, *Bojer, Hort. Maur.* 350 (*nomen*) *non Lam.* Suffrutex subscandens altus ramis angulatis striatulis vix lignosis, ramulis curvatis angulatis scabris multisulcatis ascendentibus vel deflexis. Folia basi obscure deltoideo-calcarata. Internodia ramulorum 3–6 lin. longa. Cladodia 1–3na vel ad apices ramulorum 4–6na subulata curvata 9–12 lin. longa, angulata sulcata modice robusta. Flores hermaphroditi, copiose umbellati, pedicellis 1½–2 lin.

longis infra media articulatis. Perianthium $1\frac{1}{2}$ lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento duplo breviores. Ovula in loculo plura. Baccas non vidi. *Mauritius ad montem Pouce, &c.*, Sieber! Dr. Ayres!

48. A. SUBULATUS, *Thunb. Prodr.* 63; *Flor. Cap.* 333; *Kunth, Enum.* v. 74. Suffrutex parvus caulibus teretibus viridibus vix lignosis valde flexuosis, ramulis firmis insigniter flexuosis infimis deflexis. Folia infima basi obscure calcarata. Internodia suprema 2–6 lin. longa. Cladodia 1–3na subulata stricta 9–15 lin. longa, $\frac{1}{3}$–$\frac{1}{2}$ lin. crassa, dura pungentia recta multistriata divaricata. Flores hermaphroditi umbellati, pedicellis 2–$2\frac{1}{2}$ lin. longis, prope basin articulatis. Perianthium $\frac{1}{2}$ lin. longum, segmentis flore expanso late falcatis. Antheræ oblongæ filamento 3–4plo breviores. *Caput Bonæ Spei,* Thunberg! Zeyher 250! Dr. Gill! Burchell 3063! (sub nomine *A. glaucescentis,* MSS.). *Natalia,* Gerrard 228!

49. A. STELLATUS, *Baker.* Suffrutex erectus ramosissimus caulibus primariis 2–3 lin. crassis teretibus albidis glabris distincte multisulcatis, ramis et ramulis similibus gracilioribus semper erecto-patentibus. Folia infima in spinas duras uncinatas 2–3 lin. longas producta. Internodia suprema $\frac{1}{2}$ lin. longa. Cladodia dense fasciculata 6–15na rosulata $\frac{1}{2}$ lin. longa, duplo longiora quam lata, firma recta oblanceolato-oblonga pallide viridia profunde 4-sulcata. Flores non vidi. *C. B. Spei,* Drège 8589! Cooper 622! Habitus omnino *A. microraphis,* cladodiis brevissimis omnium in rosulas densas stellatas dispositis.

50. A. MICRORAPHIS, *Baker.*—Asparagopsis microraphis, *Kunth, Enum.* v. 83. Suffrutex erectus lignosus caulibus primariis 2 lin. crassis albidis glabris teretibus distincte multisulcatis, ramis et ramulis divaricatis interdum recurvatis. Folia caulina in spinas duras pungentes subrectas 2–3 lin. longas producta. Internodia superiora $\frac{1}{2}$–1 lin. longa. Cladodia 4–10na 1–$1\frac{1}{2}$ lin. longa, subulata crassa angulata sulcata mucronata ascendentia vel patentia. Flores hermaphroditi, ex axillis solitarii, pedicellis patentibus $1\frac{1}{2}$–2 lin. longis, supra basin articulatis. Perianthium 1 lin. longum segmentis flore expanso late patentibus. Antheræ oblongæ filamento duplo breviores. *Caput Bonæ Spei,* Drège 3534! Burchell 2781!

51. A. VAGINELLATUS, *Bojer in Herb. Kew.* Suffrutex ramosissimus scandens caulibus primariis gracillimis firmis teretibus lignosis pallidis vel brunneis, ramulis copiosis gracillimis firmis curvatis ascendentibus vel deflexis. Spinæ distincte uncinatæ. Internodia ramulorum $\frac{1}{2}$–1 lin. longa. Cladodia 3–6na ascendentia setacea subulata stricta $1\frac{1}{2}$–2 lin. longa. Flores hermaphroditi. Pedicelli solitarii vel gemini $1\frac{1}{2}$–

2 lin. longi medio articulati. Perianthium $\frac{3}{4}$–1 lin. longum segmentis ascendentibus. Antheræ minutæ, filamento triplo breviores. Bacca 2 lin. crassa. *Madagascar scandens in arboribus prov. Emirni,* Bojer! Lyall 13! Blackburn!

52. A. PAULI-GULIELMI, *Solms in Schweinf. Beitr.* 213. Suffrutex ramosissimus, caulibus primariis teretibus lignosis griseis vel rubellis glabris vel pubescentibus, ramulis virgatis elongatis firmis gracillimis curvatis. Folia etiam ramulorum basi in spinas uncinatas pallidas producta, majores $1\frac{1}{2}$–2 lin. longas. Internodia suprema 1–2 lin. longa. Cladodia 1–5na setacea rigidula gracillima pallida valde ascendentia 1–3 lin. longa ad nodos floriferos sæpe abortiva. Flores copiosi hermaphroditi. Pedicelli solitarii vel gemini $1\frac{1}{2}$–2 lin. longi, supra basin articulati ascendentes vel patentes vel prope basin ramulorum deflexi. Perianthium $\frac{3}{4}$–1 lin. longum, segmentis late oblanceolatis obtusis flore expanso late patentibus. Antheræ oblongæ filamento triplo breviores. Baccas non vidi. *Nubia,* Princeps P. G. von Würtemberg, Cienkowski, Petherick! *Madi,* Grant! *In ditione fluminis Zambesi ad Kongone,* Dr. Kirk! *Guinea borealis ad Nupe,* Barter 1125! *et Abbeakouta,* Dr. Irving 70!

Var. DALTONI, *Baker.* Pedicelli omnes insigniter deflexi. Perianthii segmenta anguste oblanceolata acuta flore expanso rotata vel reflexa. *Guinea borealis ad Rabba,* Dalton!

53. A. PLUMOSUS, *Baker.* Suffrutex scandens ramosissimus, caulibus primariis gracillimis teretibus glabris viridibus teretibus, ramis et ramulis multis gracillimis patentibus. Folia caulina basi in spinas parvas pungentes rectas deflexas producta. Internodia suprema $\frac{1}{2}$–1 lin. longa. Cladodia setacea 6–12na tenuissima flexuosa $1\frac{1}{2}$–2 lin. longa ascendentia vel divaricata. Flores hermaphroditi ex apice ramulorum solitarii, pedicellis brevissimis $\frac{1}{2}$ lin. longis. Perianthium 1 lin. longum, segmentis flore expanso late patentibus. Antheræ minutissimæ filamento multoties breviores. *Caput Bonæ Spei,* Drège 4482! *Kaffraria,* Cooper 202! *Natalia,* Gerrard et M'Ken 754!

54. A. COOPERI, *Baker, Gard. Chron.* 1874, 818. Suffrutex altus subscandens, caulibus primariis pallide viridibus teretibus lævibus vix lignosis, ramis et ramulis multis gracillimis patentibus parum flexuosis. Folia caulina in spinas rubras pungentes 2–3 lin. longas subrectas deflexas producta. Internodia suprema 1–2 lin. longa. Cladodia 6–15na setacea subulata recta ascendentia vel raro patentia 3–$4\frac{1}{2}$ lin. longa. Flores hermaphroditi ex axillis solitarii vel gemini, pedicellis 2 lin. longis medio articulatis. Perianthium 1 lin. longum segmentis flore expanso late patentibus. Antheræ oblongæ filamento triplo breviores. Baccæ 3 lin. crassæ. *Caput Bonæ Spei,* Cooper in hort. Saunders! *In sylvis ad latera montis Boschberg,* MacOwan 1810! Ex-

emplum cultum vidi ab Gouanio missum sub nomine "*A. asiatici*?"

55. A. FLAGELLARIS, *Baker*.—Asparagopsis flagellaris, *Kunth, Enum.* v. 103. Frutex ramosissimus ramis teretibus lævibus ramulis rectiusculis apice angulatis. Folia basi in spinas curvatas producta. Cladodia subulata tenuissima recta angulato-substriata 3 lin. longa. Flores in axillis gemini, hermaphroditi, pedicellis 2 lin. longis infra medium articulatis. Perianthium campanulatum. Antheræ filamento triplo breviores. *Senegambia ad Richard Tol,* Lelièvre (non vidi). Adest in hb. Kew. exemplum sterile speciei fortasse ejusdem (*a Guinea boreali prope Nupe,* Barter 1519 !) caulibus ramosissimis 6-pedalibus, aculeis parvis uncinatis, cladodiis setaceis gracillimis 6–12nis ascendentibus internodiis brevissimis.

56. A. SUBULATUS, *Steud. in Hohen. Pl. Nil. Exsic.* no. 1303.—A. asiaticus, *Wight, Ic.* t. 2055, *non Linn.*—A Curillus, *Wall. Cat.* 5155 B. Frutex altus ramosissimus subscandens caulibus primariis angulatis flexuosis multisulcatis ramis confertis angulatis flexuosis. Folia basi in spinas duras subulatas rectas pungentes interdum 6–9 lin. longas producta. Internodia suprema ½–1 lin. longa. Cladodia 6–12na subulata triquetra 3–4 lin. longa, divaricata vel ascendentia leviter curvata modice crassa, mucronata. Flores hermaphroditi ex axillis solitarii vel gemini, pedicellis brevissimis (½–1 lin. longis) supra medium articulatis. Perianthium 1½ lin. longum, segmentis flore expanso reflexis. Antheræ oblongæ pedicellis triplo breviores. Baccæ 2–2½ lin. crassæ. *In montibus Nilagiri,* Schmidt ! Wight 2818 !

57. A. ZANZIBARICUS, *Baker*. Suffrutex scandens ramosissimus caulibus primariis teretibus lignosis, ramulis elongatis virgatis. Spinæ patentes conicæ, maximæ 2–3 lin. longæ. Cladodia subulata 2–3 lin. longa, lateralia 3–8na, terminalia dense congesta. Internodia suprema 1 lin. longa. Pedicelli axillares gemini 1½ lin. longi. Perianthium non vidi. Bacca magnitudine pisi magni. *Insula Zanzibar,* Hillebrand 1048 ! (*herb. Mus. Brit.*).

58. A. PETERSIANUS, *Kunth, Enum.* v. 72? Suffrutex subscandens ramosissimus, caulibus primariis teretibus lignosis gracilibus firmis, ramulis elongatis gracillimis strictis vel curvatis. Folia infima in spinas parvas uncinatas producta. Internodia suprema ½–1 lin. longa. Cladodia dense fasciculata (12–20) setacea rigidula ascendentia gracillima falcata 3–4 lin. longa. Pedicelli ex axillis solitarii 1½–2 lin. longi supra basin articulati. Perianthium (solum marcescens ad basin baccæ vidi) minutum. Baccæ monospermæ 2 lin. longæ. *Mozambique,* Dr. Peters (sterile) ; *in ditione fluminis Zambesi,* Dr. Kirk !

Dr. Meller! Species imperfecte cognata ex internodiis brevissimis et cladodiis setaceis dense fasciculatis insignis.

59. A. THUNBERGIANUS, *Schult. fil. Syst.* vii. 333.—Asparagopsis Thunbergii, *Kunth, Enum.* v. 85.—Asparagus albus, *Thunb. Prod.* 66, *Flor. Cap.* 133; *Drège, Exsic. non Linn.*—Asparagopsis Dregei, *Kunth, Enum.* v. 84.—Asparagopsis Schlechtendalii, *Kunth, Enum.* v. 90. Suffrutex lignosus ramosissimus caulibus primariis lævibus subteretibus glabris rubro-brunneis, ramulis patentibus lignosis conspicue flexuosis curvatis. Folia basi in spinas uncinatas pungentes rubro-brunneas maximas 3–4 lin. longas producta. Internodia suprema ½–1½ lin. longa. Cladodia 10–15na subulata ascendentia glauco-viridia angulata canaliculata mucronata modice crassa 1½–3 lin. longa, recta vel leviter curvata. Pedicelli solitarii vel bini vel ad apices ramulorum 3–4ni, 1–1½ lin. longi infra medium articulati. Flores hermaphroditi. Perianthium 1 lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento triplo breviores. Bacca 2 lin. crassa. *Caput Bonæ Spei,* Thunberg! Masson! Krebs! Burke! Admiral Grey! Drège! Burchell 8453! 8318!

60. A. CONSANGUINEUS, *Baker.*—Asparagopsis consanguinea, *Kunth, Enum.* v. 76.—A. scandens, *Drège, Exsic. non Thunb.*—A. declinatus, *Eckl. & Zeyh. Exsic. non Linn.* Suffrutex ramosissimus alte scandens, caulibus primariis lævibus gracilibus angulatis sulcatis haud lignosis, ramis et ramulis multis patentibus gracillimis flexuosis. Folia caulina basi in spinas vix duras patentes 2–3 lin. longas producta. Internodia suprema 1–1½ lin. longa. Cladodia 10–30na setacea, 2–3 lin. longa, flexuosa recta vel curvata ascendentia vel patentia. Flores hermaphroditi ex axillis solitarii vel gemini, pedicellis cernuis 1½–2 lin. longis summo apice articulatis. Perianthium 1½ lin. longum, segmentis flore expanso late falcatis. Antheræ oblongæ filamento 3–4plo breviores. *Caput Bonæ Spei,* Thunberg! Drège! Mundt! Zeyher 1675! &c.

61. A. JACQUEMONTI, *Baker.* Suffrutex elatus ramosissimus subscandens, caulibus primariis teretibus lævissimis, ramulis flexuosis angulatis patentibus vel decurvatis. Folia basi in spinas duras, majores 2–3 lin. longas, producta. Internodia ramulorum 1–2 lin. longa. Cladodia 3–5na patentia arcuata triquetra conspicue angulata 4–5 lin. longa. Flores hermaphroditi in axillis solitarii vel gemini interdum pedunculo communi brevissimo prædito, pedicellis 1½–2 lin. longis medio articulatis. Perianthium ¾ lin. longum, segmentis flore expanso late patentibus. Antheræ minutissimæ, filamento quadruplo brevioribus. *India orientalis inter Poonah et Carli,* Jacquemont 526! An sit varietas singularis *A. racemosi* pedicellis axillaribus?

62. A. ECKLONI, *Baker.* Suffrutex subscandens ramis teretibus palli-

dis perfecte lignosis teretibus glabris, ramulis curvatis gracillimis firmis. Folia basi nullo modo calcarata. Internodia suprema 3–4 lin. longa. Cladodia 1–6na ascendentia firma recta gracillima 3–6 lin. longa. Flores hermaphroditi, ex axillis solitarii vel gemini, raro 3–4ni, pedicellis cernuis 1 lin. longis medio articulatis. Perianthium minutissimum, plene expansum non vidi. *Cap. Bonæ Spei,* Ecklon et Zeyher in herb. T. C. D. sub nomine *"A. stipularis?"*!

63. A. RUBRICAULIS, *Baker.*—Asparagopsis rubricaulis, *Kunth, Enum.* v. 87. Frutex subscandens ramis flexuosis purpurascentibus lævibus. Folia ramorum in spinas conico-subulatas producta. Cladodia setacea dense fasciculata teretiuscula estriata glabra 5–8 lin. longa, internodiis 2–3plo longiora. Flores hermaphroditi ex axillis solitarii, pedicellis cladodiis paulo brevioribus medio articulatis. Perianthium $1\frac{1}{2}$ lin. longum, antheris oblongis. *India peninsularis orientalis?* Heyne? Ex descriptione ab *A. Cooperi* præsertim recedit cladodiis duplo longioribus. An sit forma culta hujus speciei?

64. A. MINUTIFLORUS, *Baker.*—Asparagopsis minutiflora, *Kunth, Enum.* v. 89. Suffrutex parvus ramosissimus, ramis lignosis teretibus striatulis puberulis, ramulis confertis strictis gracillimis erecto-patentibus. Internodia suprema $1–1\frac{1}{2}$ lin. longa. Folia infima in spinas duras subulatas patentes $1\frac{1}{2}–2$ lin. longas producta. Cladodia 3–6na subulata setacea patentia canaliculata 5–6 lin. longa. Flores hermaphroditi ex axillis solitarii vel gemini, pedicellis brevissimis hirtellis medio articulatis. Perianthium $\frac{1}{2}–\frac{3}{4}$ lin. longum, segmentis diutine ascendentibus. Antheræ minutæ oblongæ filamento duplo breviores. *Ad sinum Delagoa,* Forbes! *Kaffraria,* Dr. Gill!

65. A. SCHWEINFURTHII, *Baker.*—A. abyssinicus, *Schwein. Pl. Callab. Exsic.* no. 29, *non Hochst.* Frutex altus ramosissimus caulibus primariis teretibus pallidis lævibus, ramis firmis elongatis apice angulatis. Folia basi in spinas parvas duras patentes producta. Internodia ramulorum 3–6 lin. longa. Cladodia ramulorum 3–6na valde ascendentia 9–15 lin. longa, stricta subulata gracillima. Pedicelli gemini gracillimi ascendentes 3–4 lin. longi prope basin articulati. Flores hermaphroditi. Perianthium 1 lin. longum, segmentis diutine ascentibus. Antheræ minutissimæ filamentis quadruplo breviores. *Callabat ad ripas fluminis Gendua,* Schweinfurth 29!

66. A. DENSUS, *Soland. in Herb. Banks.* Suffrutex lignosus ramosissimus caule primario sulcato puberulo, ramulis ultimis dense fasciculatis, nonnullis patentibus spinosis, reliquis cladodia ferentibus. Cladodia eis *A. africani* consimilia, subulata glabra angulata robusta ascendentia 4–6na 3–6 lin. longa. Flores hermaphroditi ex apice ramulo-

rum 2–4ni, pedicellis brevissimis, foliis magnis deltoideis occulti. Perianthium 1 lin. longum, campanulatum, antheris minutissimis. *Caput Bonæ Spei,* Auge in herb. Mus. Brit.!

67. A. CAPENSIS, *Linn. Sp.* 450 (*Pluk. Phyt.* t. 78. fig. 3); *Mill. Dict.* no. 9; *Jacq. Schoen.* t. 266; *Thunb. Prod.* 66; *Fl. Cap.* 134; *Bresl. Diss.* 21, *non Linn. Herb.*—A. retrofractus, *Wendl. Hort. Herren.* t. 22, *non Linn.*—Asparagopsis passerinoides, *Kunth, Enum.* v. 90. Suffrutex erectus humilis lignosus ramosissimus caulibus primariis teretibus lævibus pallidis parum flexuosis, ramis lignosis patentibus vel ascendentibus, ramulis ultimis dense fasciculatis. Folia ramorum basi in spinas duras subulatas subrectas 3–6 lin. longas producta. Internodia suprema ½–1 lin. longa. Cladodia 6–12na ascendentia subulata recta pallide viridia dense pilosa ½–1½ lin. longa. Flores hermaphroditi, ad apices ramulorum subsessiles solitarii vel gemini, foliis deltoideis membranaceis et cladodiis ascendentibus subocculti. Perianthium 1½ lin. longum diutine campanulatum. Antheræ oblongæ filamento triplo breviores. *Caput Bonæ Spei in aridis,* Thunberg! Masson! Oldenburg! Nelson! Drège 8591! 8593! Zeyher 10! 46! Sieber 85! Burchell 8451! &c.

68. A. NELSONI, *Baker.* Suffrutex ramosissimus, caule primario recto lignoso 2–3 lin. crasso dense puberulo, ramis copiosis erecto-patentibus apice spinosis, ramulis ultimis dense fasciculatis nonnullis spinosis, reliquis cladodia gerentibus. Cladodia 3–6na ascendentia glauco-viridia 1½–2 lin. longa. Flores ex apice ramulorum producti, foliis magnis membranaceis subocculti, pedicellis brevissimis. Perianthium non vidi. *Cap. B. Spei,* Nelson in herb. Mus. Brit.! Inter *A. stipulaceum* et *capensem* medium tenens, ramificatione prioris, floribus subsessilibus foliis terminalibus suboccultis posterioris.

69. A. STIPULACEUS, *Lam. Ency.* i. 296; *Bresl. Diss.* no. 5; *Schult. fil. Syst.* vii. 333.—Asparagopsis stipulacea, triacantha, et Zeyheri, *Kunth, Enum.* v. 91, 92.—Asparagopsis suaveolens, *Burchell, Travels,* ii. 226. Suffrutex ramosissimus lignosus 1–2-pedalis, caule primario erecto pallido tereti glabro flexuoso, ramis lignosis patentibus flexuosis, ramulis ultimis ex nodis dense fasciculatis, nonnullis duris spinosis patentibus lateralibus sæpe geminis vel ternis, reliquis caducis fragilibus cladodia ferentibus. Folia basi haud calcarata. (Spinæ sunt omnes ramuli abbreviati.) Internodia ramulorum ½–1½ lin. longa. Cladodia 3–6na ascendentia subulata angulata canaliculata gracillima glauco-viridia 2–3 lin. longa. Flores hermaphroditi, ex apice ramulorum semper terminales, solitarii vel gemini, raro 3–4ni, pedicellis 1–1½ lin. longis, supra basin articulatis, bracteis minutissimis multoties longioribus. Perianthium 1 lin. longum, segmentis flore expanso late patentibus. Antheræ minutissimæ filamento 3–4plo breviores. *Caput*

Bonæ Spei, Sonnerat, Zeyher, Burchell 1956! Mundt! Shaw! MacOwan 1774! *Natalia*, Gerrard 542! Sutherland!

Var. SPINESCENS, *Baker* (Asparagopsis spinescens, *Schult. fil. Syst.* vii. 334.—Asparagopsis spinescens, *Kunth, Enum.* v. 93), est forma cladodiis robustioribus. *C. B. Spei*, Zeyher 4163!

70. A. BURCHELLII, *Baker*. Suffrutex 3–4-pedalis erectus ramosissimus, caulibus primariis teretibus albidis lævibus nitidulis valde flexuosis, ramis lignosis valde flexuosis interdum deflexis, ramulis ultimis gracillimis fragilibus 6–12 lin. longis dense fasciculatis. Rami lignosi spinis pungentibus subrectis 3–4 lin. longis præditi. Internodia ramulorum $\frac{1}{2}$–$1\frac{1}{2}$ lin. longa. Cladodia 2-6na ascendentia subulata dura recta pallide viridia 1–$1\frac{1}{2}$ lin. longa. Flores hermaphroditi ex apice ramulorum solitarii, pedicellis $\frac{1}{2}$–1 lin. longis. Perianthium $\frac{1}{2}$ lin. longum diutine campanulatum, antheris minutissimis filamento triplo brevioribus. *Cap. Bonæ Spei in aridis*, Burchell 2962! Zeyher (*Asparagus* 10)! Cooper 1574!

71. A. PUBERULUS, *Baker*. Suffrutex late volubilis, ramis teretibus vix lignosis ubique persistenter albido-puberulis, ramulis elongatis firmis curvatis ascendentibus vel deflexis. Folia basi in spinas duras rectas interdum 3–6 lin. longas producta. Internodia suprema 2–3 lin. longa. Cladodia subulata gracillima stricta 3–6na, 1–2 lin. longa, ascendentia ad nodos floriferos sæpe abortiva. Pedicelli umbellati $1\frac{1}{2}$ lin. longi prope basin articulati. Umbellæ sæpe ad apices ramulorum brevium terminales. Flores hermaphroditi minutissimi. Perianthium $\frac{1}{2}$ lin. longum, segmentis diutine ascendentibus. Antheræ minutissimæ. *In ditione fluminis Zambesi ad montes Manganga*, Dr. Meller!

72. A. ASIATICUS, *Linn. Sp.* 449. *Mant.* 366 (*Plukenet, Almag.* 54, t. 15. fig. 4); *Mill. Dict.* no. 8; *Bresl. Diss.* no. 12; *Willd. Sp.* ii. 153, *non Wight, Ic.* t. 2055.—Asparagopsis Willdenovii, *Kunth, Enum.* v. 86.—A. divaricatus, *Rottler, Herb.*—Asparagopsis scoparia, *Kunth, Enum.* v. 80; *Schwein. Pl. Nilot.* 38, t. 13.—Asparagus mitis, *A. Rich. Fl. Abyss.* ii. 319.—A. scaberulus, *A. Rich. Fl. Abyss.* ii. 320.—A. rivalis, *Burchell, Travels*, i. 400. Suffrutex elatus ramosissimus scandens, caulibus primariis teretibus gracilibus lævibus vix lignosis ramulis strictis vel parum flexuosis patentibus vel parum deflexis striatulis scabriusculis. Folia basi in spinas duras uncinatas producta. Internodia suprema 2–3 lin. longa. Cladodia 6–15na subulata stricta teretia gracilia canaliculata mucronata 3–6 lin. longa. Flores hermaphroditi. Pedicelli axillares umbellati $1\frac{1}{2}$3 lin. longi medio articulati. Perianthium 1–$1\frac{1}{2}$ lin. longum, segmentis diutine ascendentibus. Antheræ minutæ filamento 3–4plo breviores. Ovula in loculo plura. Bacca monosperma 2 lin. crassa. *India*

orientalis peninsularis, Rottler! Konig! *Abyssinia*, Salt! Roth! Schimper 181! 240! 296! 728! &c. *Africa tropicalis orientalis ad Tette*, Kirk! *Mozambique*, Peters! *Sennaar*, Hartmann! *Caput Bonæ Spei*, Baines! Burchell 2376! 2587! Drège 4481 *b*! *Natal*, Gerrard 70!

73. A. AFRICANUS, *Lam. Encyc.* i. 295 (*Plukenet, Amal.* 40, t. 374. fig. 4); *Bresl. Diss.* no. 9; *Schult. fil. Syst.* vii. 331.—Asparagopsis Lamarckii, *Kunth, Enum.* v. 87.—Asparagopsis juniperina, *Kunth, Enum.* v. 85.—Asparagus dependens, *Thunb. Prodr.* 66; *Fl. Cap.* 133; *Bresl. Diss.* no. 7; *Kunth, Enum.* v. 74.—A. rubicundus, *Berg. Cap.* 88?—A. capensis, *Linn. Herb.* Suffrutex ramosissimus 6-pedalis et ultra interdum subscandens, ramis primariis teretibus lignosis lævibus ramulis gracillimis lignosis flexuosis ascendentibus vel deflexis. Folia basi in spinas duras producta, majores uncinatas 2–3 lin. longas sæpe rubras. Internodia suprema 1½–3 lin. longa. Cladodia ramulorum 6–12na ad apices ramulorum sæpe 20 vel ultra subulata rigidula ascendentia 4–6 lin. longa, recta vel leviter curvata subteretia canaliculata. Pedicelli axillares umbellati (interdum solitarii vel gemini) 1½–3 lin. longi, infra medium articulati. Flores hermaphroditi. Perianthium 1–1½ lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento triplo breviores. Baccæ monospermæ 2 lin. crassæ, *Caput Bonæ Spei*, Drège 8576! 8577! Harvey 423! Burchell 243! 389! 719! 2443! 2677! 4269! 7221! Zeyher 178! Krauss 413! Gerrard 126! Cooper 191! 523! 3250! &c.—A. DEPENDENS, *Thunb.*! est forma ramis deflexis cladodiis brevioribus crassioribus. A. MICROPHYLLUS, *Burch. MSS.* (ramis et ramulis pallidis multistriatis cladodiis 2 lin. longis, dense fasciculatis curvatis), var. PUBESCENS, *Baker* (Zeyher 236! 4158! Ecklon, Smil. 15! Cooper 414!), est forma campestris ramis rigidis brevibus deflexis dense pubescentibus; var. CONCINNUS, *Baker* (Burchell 3120!), est forma ramis et ramulis gracillimis ascendentibus brunneis lævibus cladodiis gracilibus 2 lin. longis; var. WRIGHTII, *Baker* (Simons Bay, C. Wright 454!), ramis distincte multisulcatis, cladodiis 6 lin. longis, ⅓ lin. crassis, distincte 4-angulatis inter angulos profunde canaliculatis, baccis majoribus. ASPARAGOPSIS NIVENIANA, *Kunth, Enum.* v. 88, est verisimiliter forma hujus speciei pedicellis fortuito solitariis.

74. A. ALBUS, *Linn. Sp. Plant.* edit. ii. 449 (*Parkinson, Theat.* 455, fig. 5); *Mill. Dict.* no. 4; *Bresl. Diss.* no. 8; *Schult. fil. Syst.* vii. 332, 1774.—Asparagopsis alba, *Kunth, Enum.* v. 84.—Asparagus Pastorianus, *Webb et Berth. Phyt. Can.* iii. 329, t. 229. Frutex erectus 1–3-pedalis caulibus lignosis pallidis lævibus teretibus valde flexuosis ramis lignosis flexuosis ascendentibus vel deflexis. Folia in spinas duras pungentes 6–9 lin. longas patentes persistentes producta.

Cladodia 6–12na subulata 6–9 lin. longa, arcuata angulata canaliculata cite caduca. Flores perfecte hermaphroditi. Pedicelli dense umbellati $1\frac{1}{2}$–2 lin. longi, infra medium articulati. Perianthium 1 lin. longum, segmentis flore expanso late falcatis. Antheræ oblongæ obtusæ purpureæ filamento 2–3plo breviores. Ovula in loculo 3–4. Bacca 2–$2\frac{1}{2}$ lin. crassa sæpe monosperma. *Insulæ Fortunatæ, Hispania, Lusitania, Algeria, Corsica, Sardinia, et Italia meridionalis in collibus aridis.* Turiones edules.

75. A. IRREGULARIS, *Baker.* Suffrutex volubilis late scandens, ramis vix lignosis, ramulis gracillimis virgatis firmis teretibus. Folia infima basi in spinas duras brunneas producta. Internodia ramulorum 3–6 lin. longa. Cladodia 2–6na, vel ad apices ramulorum plura, ad ramos floriferos sæpe abortiva, ascendentia rigidula gracillima subulata 6–9 lin. longa. Pedicelli parce umbellati 2–3 lin. longi infra medium articulati. Perianthium 1–$1\frac{1}{4}$ lin. longum, segmentis diutine ascendentibus. Flores hermaphroditi. Antheræ oblongæ filamento duplo breviores. *In ditione fluminis Zambesi ad montem Tshiradzura,* Dr. Kirk!

76. A. ABYSSINICUS, *Hochst. in Schimp. Pl. Abyss.* no. 2216; *A. Rich. Fl. Abyss.* ii. 319.—A. retrofractus, *Forsk. Fl. Ægypt.* 73, *non L.* Frutex elatus ramosissimus, caulibus primariis teretibus lævibus pallidis, ramis virgatis elongatis parum flexuosis duris. Folia basi in spinas parvas duras producta. Internodia ramulorum 3–6 lin. longa. Cladodia ramulorum 4–8na, ad apices ramorum et ramos vetustos 10–20na, subulata firma ascendentia, 6–12 vel interdum 18 lin. longa, subteretia vel obscure compressa recta vel parum curvata. Pedicelli dense umbellati 2–3 lin. longi. Flores hermaphroditi. Perianthium 1 lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ minutæ filamento 3–4plo breviores. Bacca monosperma 2 lin. crassa. *Arabia in collibus granitosis prope Djeddam,* W. P. Schimper 914! (Unio, Itin., sub nomine *A. asiatici*). *In ditione Nili Albi,* Petherick! *Abyssinia,* Schimper! *Congo,* Prof. C. Smith! *Senegambia,* Heudelot 462! (*Bidjem*) 204! *Guinea borealis ad Nupe,* Barter 1516! An sit varietas tropicalis *A. africani*?

77. A. LARICINUS, *Burchell, Travels,* i. 537; *Bresl. Diss.* no. 40; *Schult. fil. Syst.* vii. 337; *Kunth, Enum.* v. 75. Suffrutex elatus ramosissimus, caulibus lignosis teretibus pallidis sæpe flexuosis, ramulis flexuosis ascendentibus vel patentibus conspicue striatis. Folia infima in spinas parvas conicas deflexas duras producta. Internodia suprema $1\frac{1}{2}$–3 lin. longa. Cladodia lateralia 6–10, ad apices ramorum sæpe 20–30, ascendentia subulata recta pallide viridia stricta 9–12 lin. longa. Flores hermaphroditi dense umbellati, pedicellis 3–4 lin. longis infra medium articulatis. Perianthium $1\frac{1}{2}$ lin. longum, segmentis

diutine ascendentibus. Antheræ oblongæ filamento triplo breviores. *Caput Bonæ Spei,* Burchell 1971! 2227! Zeyher (Aspar. no. 21)! Bowker!

78. A. RETROFRACTUS, *Linn. Sp.* 449 (*Pluck. Alm.* 40, t. 375); *Miller, Dict.* no. 5; *Lam. Ency.* i. 295; *Bresl. Diss.* no. 10; *Schult. fil. Syst.* vii. 330, *non Forsk.*—A. declinatus, *Sieb. Herb. Cap.* no. 84, *non L.* —Asparagopsis retrofracta, *Kunth, Enum.* v. 89. Suffrutex ramosissimus, ramis lignosis teretibus valde flexuosis pallidis ramulis lignosis flexuosis interdum deflexis. Folia infima in spinas parvas duras deflexas producta. Internodia suprema 1¼–3 lin. longa. Cladodia dense fasciculata, lateralia 10–12, ad apices ramorum sæpe 30–40, subulata firma gracillima patentia curvata 6–12 lin. longa. Flores hermaphroditi umbellati pedicellis 3–4 lin. longis infra medium articulatis. Perianthium 1½ lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento 2–3plo breviores. *Caput Bonæ Spei,* hort. Pallas! Sieber! Zeyher 1674! Burchell 3060! 3599! (forma ramis rectis cladodiis crassioribus).

79. A. ERECTUS, *Thunb. Prodr.* 65; *Fl. Cap.* 132.—Dracæna erecta, *Linn. Suppl.* 204; *Willd. Sp.* ii. 158; *Schult. fil. Syst.* vii. 346.—Myrsiphyllum erectum, *Schlecht*; *Kunth, Enum.* v. 109. Suffrutex parvus erectus, caulibus lignosis teretibus lævibus pallide viridibus, ramis et ramulis flexuosis duris ascendentibus. Folia basi haud calcarata. Internodia ramulorum 3–6 lin. longa. Phyllocladia solitaria dura ascendentia lanceolata 9–12 lin. longa, 2–3 lin. lata, striis 4 validis prædita. Flores hermaphroditi, pedicellis ex axillis sæpissime solitariis, raro 2–4nis, 2 lin. longis, supra medium articulatis. Perianthium 2 lin. longum, segmentis flore expanso late falcatis. Antheræ minutissimæ, filamento multo breviores. Bacca 3 lin. crassa. *Caput Bonæ Spei in aridis,* Thunberg!

80. A. STRIATUS, *Thunb. Prodr.* 65; *Fl. Cap.* 132.—Dracæna striata, *Linn. Suppl.* 204; *Willd. Sp.* ii. 157; *Schult. fil. Syst.* vii. 346.—Myrsiphyllum striatum, *Schlecht. in Kunth, Enum.* v. 110. Suffrutex parvus erectus caulibus primariis strictis lignosis pallide viridibus teretibus lævibus, ramis et ramulis brevibus strictis duris flexuosis erecto-patentibus. Folia caulina basi calcari obscuro rubro adpresso prædita. Internodia suprema 1–3 lin. longa. Phyllocladia crassa linearia plana erecto-patentia dura 6–12 lin. longa, 1½–2 lin. lata, utrinque inæqualiter distincte 5–7-striata, lateralia solitaria, ad apices ramorum gemina. Flores hermaphroditi ex apice ramulorum parce vel dense umbellati, pedicellis 3 lin. longis supra basin articulatis. Perianthium 2–2½ lin. longum, segmentis ligulatis flore expanso late falcatis. Antheræ minutissimæ filamento 5–6plo breviores. *Caput Bonæ Spei*

in campis aridis, Thunberg! Burchell 2900! 3271! MacOwan 1802! Drège 8564 *c*! Cooper 2464! &c.

Var. LINEARIFOLIUS, *Baker* (Asparagus erectus, *Thunb. Herb. ex parte*), est forma frequentior phyllocladiis angustioribus circiter 1 lin. latis striatis. *C. B. Spei,* Thunberg! Burchell 1570! Zeyher 480! Ecklon (Smilac. No. 6)! Drège 8564 *a*! Bolus 516!

Var. DREGEI, *Baker,* est forma ramis magis divaricatis phyllocladiis paucis distantibus ½ lin. latis, 1–3-sulcatis. *C. B. Spei,* Drège 8565!

81. A. SCANDENS, *Thunb. Prodr.* 63; *Fl. Cap.* 335; *Willd. Sp.* ii. 252; *Bressl. Diss.* no. 3; *Schult. Syst.* vii. 325; *Baker in Saund. Ref. Bot.* t. 21.—Asparagopsis scandens, *Kunth, Enum.* v. 78.—Asparagus pectinatus, *Red. Lil.* t. 407.—Dracæna volubilis, *Linn. Suppl.* 204! Herba late longe scandens, ramis gracillimis teretibus glabris, ramulis debilibus curvatis. Folia basi haud calcarata. Internodia suprema ½–1 lin. longa. Phyllocladia sæpissime terna linearia falcata acuta ascendentia 3–6 lin. longa, ½ lin. lata distincte unicostata. Flores hermaphroditi, pedicellis ex axillis solitarii vel gemini, 3–6 lin. longi, cernui penduli supra medium articulati. Perianthium 1½–2 lin. longum, segmentis diutine ascendentibus. Antheræ oblongæ filamento 3–4plo breviores. Bacca coccinea 3 lin. crassa. *Caput Bonæ Spei,* Thunberg! Burchell 434! 5149! 5729! Drège 8570 *a*! Zeyher, &c. et sæpe in hortis culta.

Var. DEFLEXUS, *Baker.* Caules primarii lignosi 1½ lin. crassi, ramulis densis deflexis insigniter flexuosis, phyllocladiis firmioribus minoribus, floribus minoribus. *In sylvis montis Boschberg,* MacOwan 1771!

82. A. RAMOSISSIMUS, *Baker.* Suffrutex ramosissimus late scandens ramulis gracillimis ultimis multis brevibus patentibus vel ascendentibus. Folia basi obscure calcarata. Internodia suprema 1–2 lin. longa. Phyllocladia subpatentia linearia falcata 3–5 lin. longa, 3–8na. Flores hermaphroditi ex apice ramulorum solitarii, pedicellis cernuis supra medium articulatis 1½–2 lin. longis. Perianthium 1 lin. longum, segmentis flore expanso patentibus. Stamina perianthio paulo breviora, antheris oblongis filamento æquilongis. Stylus apice distincte tricuspidatus. *Cap. B. Spei,* Cooper in hort. Saunders 5102. (Ex icone Fitchii descriptum.)

83. A. NEPALENSIS, *Baker.*—Asparagus Curillus, *Wall. Cat.* 5155 C. Suffrutex ramosissimus subscandens, caulibus lævibus, ramulis deflexis angulatis. Folia basi in spinas duras 3–6 lin. longas producta. Internodia suprema 1½–3 lin. longa. Cladodia 3–6na patentia vel ascendentia triquetra recta 2 lin. longa. Racemi copiosi 1–3ni patentes 1–1½ poll. longi, 5–6 lin. crassi interdum deorsum compositi. Flores

hermaphroditi. Pedicelli 1½-2 lin. longi medio articulati. Bracteæ minutæ lanceolatæ. Perianthium campanulatum 1 lin. longum, antheris minutissimis oblongis purpureis filamento 4–6plo brevioribus. *Nepaulia,* Wallich!

84. A. LÆVISSIMUS, *Steud. in Hohen. Pl. Nilg. Exsic.* no. 1304 et 1305. Suffrutex subscandens, caulibus primariis teretibus lævibus, ramulis gracillimis triquetris ascendentibus vel recurvatis. Folia basi in spinas duras 3–6 lin. longas producta. Internodia suprema 1½–2 lin. longa. Cladodia 3–6na patentia vel ascendentia triquetra 3–4 lin. longa, ¼–⅙ lin. crassa. Flores hermaphroditi. Racemi densi 1–2 poll. longi, solitarii vel gemini, pedicellis 1–1½ lin. longis, medio articulatis, basi bracteis magnis ovatis cucullatis præditis. Perianthium 1 lin. longum, segmentis oblanceolatis late patentibus. Antheræ minutistissimæ purpureæ. *In montibus Nilagiri* (*A. volubilis,* Wall. Cat. 5154 K), Wight 2816! Gardner! &c. *Concan,* Law! Sir F. Adam! Vix ultra varietatem montanam *A. racemosi.*

85. A. RACEMOSUS, *Willd. Sp.* ii. 152; *Bresl. Diss.* no. 13; *Roxb. Fl. Ind.* ii. 151; *Wt. Ic.* t. 2056.—A. volubilis, *Ham. in Wall. Cat. excl. D et K.*—A. acerosus, *Wall. Cat. A, B & F, non Roxb.*—Asparagopsis floribunda, *Kunth, Enum.* v. 98.—A. sarmentosus, *Heyne in Wall. Cat.* 5154, ii., *non Linn.*—A. fasciculatus, *R. Br. Prodr.* 281, *ex parte.* —Asparagopsis Brownei, *Kunth, Enum.* v. 103, *ex parte.*—A. dubius, *Decaisne, Nouv. Ann. Mus.* iii. 363.—Asparagopsis Decaisnei, *Kunth, Enum.* v. 103.—A. Petitianus, *A. Rich. Fl. Abyss.* ii. 320.—Asparagopsis abyssinica, *Kunth, Enum.* v. 101.—A. Hohenackeri, *Kunth,* v. 100. Suffrutex ramosissimus late scandens, caulibus lignosis teretibus lævibus, ramulis triquetris inferioribus patentibus vel ascendentibus. Folia basi in spinas duras interdum 3–6 lin. longas producta. Internodia suprema 1½–3 lin. longa. Cladodia ramulorum 2–6na, falcata 6–9 lin. longa, divaricata triquetra vel obscure compressa. Flores hermaphroditi ex axillis racemosi. Racemi solitarii vel plurimi raro thyrsoideo-paniculati, 1–2 poll. longi, laxi, 6–8 lin. lati, pedicellis gracillimis patentibus 2–2½ lin. longis, ad medium articulatis basi bracteis minutis membranaceis præditis. Perianthium 1–1½ lin. longum, segmentis flore expanso late patentibus, antheris minutissimis oblongis purpureis filamento 4–6plo brevioribus. Ovula in loculo 6–8. Baccæ monospermæ 2–2½ lin. crassæ. *Per zonam totam tropicalem veteris orbis ab Australia boreali ad Angolam. Per montes Himalayæ centrales et orientales ad* 4000 *pedes ascendens.*—ASPARAGOPSIS RETROFRACTA, *Schwein. Pl. Nub. Exsic.* no. 504, est forma hujus speciei cladodiis ad ramos vetustos valde congestis.

Var. ZEYLANICUS, *Baker.* Varietas luxurians cladodiis incrassatis 5–6 lin. longis, ½ lin. crassis insigniter triquetris, racemis interdum 3–4

poll. longis, apice cladodiis multis comatis. *Zeylania*, Walker! Gardner! Thwaites!

Var. JAVANICUS, *Baker*.—Asparagopsis javanica, *Kunth, Enum.* v. 101; *Miquel, Flor. Ind.-Bat.* iii. 562.—A. sarmentosa, *Dalzell, Bomb. Flora*, 246, *non Kunth*. Cladodia gracillima flexuosa 6–12 lin. longa. Racemi angusti apice cladodiis multis comati. Perianthium minus segmentis angustioribus. *Java*, Zollinger 2572! *India orientalis peninsularis*, Law! Stocks! Hook. et Thom. Aspar. no. 4!

Var. SUBACEROSUS, *Baker*. Forma ad *acerosum* accedens cladodiis strictis 6–9 lin. longis, $\frac{1}{4}$ lin. crassis triquetris. Racemi parvi pauciflori. *Sikkim* 1000–4000 *pedes*, Hook. fil. et Thomson!

Var. TETRAGONUS, *Baker*.—A. tetragonus, *Bresl. Diss.* no. 15; *Schult. fil. Syst.* vii. 329.—A. stachyoides, *Spreng. MSS.*—Asparagopsis Krebsiana et subquadrangularis, *Kunth, Enum.* v. 93. Varietas extratropicalis africana cladodiis 3-6 lin. longis, $\frac{1}{3}$ lin. crassis, conspicue angulatis et striatis, pedicellis reductis sæpe $1\frac{1}{2}$ lin. longis, racemis angustioribus. *Caput Bonæ Spei*, Drège 3489 *b*! Zeyher! Burchell 2889! 3281! Cooper 1511! MacOwan 1808! Ecklon et Zeyher no. 8! Bolus 57! &c.

86. A. ACEROSUS, *Roxb. Fl. Ind.* ii. 150; *Wall. Cat.*, 5152 C, D, E.—Asparagopsis acerosa, *Kunth, Enum.* v. 102.—Asparagus fasciculatus, *R. Br. Prod. Austral.* 281, *ex parte*.—Asparagopsis Brownei, *Kunth, Enum.* v. 103, *ex parte*. Suffrutex elatus ramosissimus subscandens, ramis primariis lævibus teretibus, ramulis gracillimis firmis angulatis canaliculatis ascendentibus. Folia basi in spinas duras parum curvatas 2–3 lin. longas producta. Cladodia 3–6na ascendentia stricta triquetra 1–3 poll. longa, $\frac{1}{4}$ lin. crassa ad apicem attenuata. Flores hermaphroditi. Racemi copiosi solitarii vel gemini laxi 6–24 lin. longi, 6–8 lin. crassi. Pedicelli $2–2\frac{1}{2}$ lin. longi, medio articulati basi bracteis minutis lanceolatis navicularibus præditi. Perianthium $1–1\frac{1}{2}$ lin. longum, segmentis, flore expanso, late patentibus. Antheræ minutissimæ subglobosæ purpureæ filamento 4–6plo brevioribus. Bacca monosperma $2–2\frac{1}{2}$ lin. crassa. Ovula in loculo plura. *Chittagong in hortis*, Hk. fil. et Thoms.! *Mergui*, Griffith 5960! *Birma*, M'Clelland! Gomez! Lobb 394! *Australia borealis*, R. Brown!

87. A. ASCENDENS, *Roxb. Fl. Ind.* iii. 153.—Asparagopsis ascendens, *Kunth, Enum.* v. 102.—Asparagus volubilis, *Wall. Cat.* 5154 D, *ex parte*. Suffrutex elatus ramosissimus, caulibus primariis teretibus albidis lævibus, ramulis ultimis gracillimis ascendentibus angulatis. Folia basi in spinas duras subulatas rectas interdum 6–9 lin. longas producta. Internodia suprema 1–2 lin. longa. Cladodia 6–20na subulata gracillima firma curvata ascendentia 9–12 lin. longa. Flores hermaphroditi. Racemi copiosi densi 1–2 poll. longi, $4–4\frac{1}{2}$ lin. lati interdum apice comati vel subpaniculati. Pedicelli 1–3 lin. longi,

medio articulati, basi bracteis minutis lanceolatis suffulti. Perianthium 1½ lin. longum, segmentis flore expanso reflexis. Antheræ minutissimæ, filamento 4–6plo breviores. Ovula in loculo plurima. Bacca monosperma 2–2½ lin. crassa. *Himalaya occidentalis* 2000–5300 *pedes (Kumaon, Punjaub, Rohilcund, Simla)*, Thomson! Madden! Strachey et Winterbottom! Aitchison 1223! *Afghanistan*, Griffith 5855! 5858!

88. A. SARMENTOSUS, *Linn. Sp. Plant.* edit. i. 314; *Mill. Dict.* no. 10; *Ait. Hort. Kew.* edit. 2, ii. 278; *Bresl. Diss.* no. 18; *Schult. fil. Syst.* vii. 336.—Asparagopsis sarmentosa, *Kunth, Enum.* v. 97. Suffrutex ramosissimus, caulibus lignosis teretibus multisulcatis rectis vel flexuosis, ramulis multis brevibus angulatis profunde sulcatis. Folia ramorum in spinas rectas deflexas pungentes 2–3 lin. longas basi producta. Internodia suprema brevissima ¼–½ lin. longa. Phyllocladia solitaria ascendentia linearia plana glabra distincte unicostata 6–9 lin. longa, ½ lin. lata firma mucronata. Flores hermaphroditi racemosi. Racemi 2–3 poll. longi, 4–5 lin. lati, pedicellis 1–1½ lin. longi, medio articulatis basi bracteis lanceolatis præditis. Perianthium 1 lin. longum, segmentis late patentibus. Antheræ minutæ filamento 3–4plo breviores. Bacca monosperma 2–2½ lin. crassa. *Caput Bonæ Spei*, hort. Paris. 1816 in herb. DC.! herb. Thunberg (sub nomine *A. racemosi*)! Zeyher 1061! Burchell 3302! 3383! Cooper 3603! *Natalia*, Sutherland! Habitus et flores *A. racemosi* sed facile distinguitur internodiis brevissimis et phyllocladiis planis semper solitariis.

Var. COMATUS, *Baker*.—A. aculeatus maximus sarmentosus zeylanicus, *Herm. Hort. Acad. Lug.-Bat.* 63, *cum icone*.—A. sarmentosus, *Red. Lil.* t. 460, ab typo recedit racemis elongatis supra partem floriferam et sæpe etiam ex nodis floriferis cladodiis præditis, pedicellis sæpe geminis vel ternis. *Cap. Bonæ Spei*, hort. Kew. 1778! Cooper 402! 192! 3251! Admiral Grey! Murray! MacOwan 1772! (E. Zeylania non vidi).

Var. DENSIFLORUS, *Baker*.—Asparagopsis densiflora, *Kunth, Enum.* v. 96, est varietas phyllocladiis minoribus circiter 3 lin. longis, racemis haud comatis. *Cap. B. Spei*, Delaroche ex hort. Lugd.-Bat. in herb. DC.! Burchell 3061! 4208! Bowker! Lalande! Whitehead!

Var. KUNTHII, *Baker*.—Asparagopsis lancea, *Kunth, Enum.* v. 105, *excl. syn.*, est varietas ramis laxioribus longioribus, internodiis longioribus, phyllocladiis 9–12 lin. longis, 1–1½ lin. latis, racemis 3–4 poll. longis, apice haud comatis. *C. B. Spei*, Burchell 5232! Admiral Grey!

89. A. OXYACANTHUS, *Baker*. Suffrutex ramulis lignosis rectis teretibus crassis dense pubescentibus. Folia omnia basi in spinas pungentes subulatas deflexas rectas producta. Internodia ramulorum bre-

vissima. Phyllocladia conferta solitaria erecto-patentia ligulata 12–15 lin. longa, 2–2½ lin. lata, obtusa cuspidata ad basin cite angustata firma crassa utrinque glabra distincte unicostata marginibus reflexis. Racemi densi 1–1½ poll. longi, 3–4 lin. crassi. Bracteæ lanceolatæ 1½ lin. longæ. Pedicelli brevissimi supra medium articulati. Perianthium hermaphroditum, 1 lin. longum, segmentis ascendentibus. Antheræ minutissimæ filamento 3–4plo breviores. *Cap B. Spei, in ditione Somerset,* Bowker! *Albany,* Bowie!

90. A. FALCATUS, *Linn. Sp.* 449; *Burm. Fl. Zeyl.* 36, t. 13, fig. 2 (inflorescentia male depicta); *Bresl. Diss.* no. 2; *Kunth, Enum.* v. 71, *non Thunb. Fl. Jap. nec Linn. Herb.*—A. æthiopicus, var. ternifolius, *Baker in Saund. Ref. Bot.* t. 261; *Gard. Chron.* 1872, 1587, *cum icone.* Suffrutex elatus ramosissimus subscandens ramis teretibus lævibus ramulis gracillimis lignosis flexuosis. Folia ramorum basi in spinas duras 2–3 lin. longas producta. Internodia suprema 2–3 lin. longa. Phyllocladia 1–3na vel ad apices ramorum 6–8na ensiformia plana 2–4 poll longa 1–3 lin. lata, firmula curvata unicostata ad apicem angustata. Flores hermaphroditi, in racemos laxos paucifloros dispositi. Pedicelli 2–3 lin. longi, medio articulati, basi bracteis minutis albidis lanceolatis prædìti. Perianthium albidum suaveolens 1 lin. longum, segmentis flore expanso reflexis. Antheræ minutissimæ subglobosæ. Bacca monosperma 3 lin. crassa. *Zeylonia,* Konig! Thwaites 2298! Hook. fil. et Thoms. *Aspar.* 14! &c. *Zanzibar,* Sir Bartle Frere! *Moramballa,* Dr. Kirk! *Zanguebaria, ad Momfia et Bagomayo,* Kirk! *Congo,* Prof. C. Smith! *Natal,* Gerrard 746! Gerrard et M'Ken 753! *Kaffraria,* Cooper 3253!

91. A. ÆTHIOPICUS, *Linn. Mant.* 63; *Willd. Sp.* ii. 153; *Schult. Syst.* vii. 335.—Asparagopsis æthiopica, *Kunth, Enum.* v. 95.—Asparagus lanceus, *Thunb. Prodr.* 66; *Flor. Cap.* 134.—A. falcatus, *Linn. Herb.*! Suffrutex altus scandens, ramis lignosis teretibus pallidis glabris distincte multisulcatis, ramulis angulatis sulcatis curvatis. Folia infima in spinas duras pungentes 2–3 lin. longas producta. Internodia suprema 1–1½ lin. longa. Phyllocladia 3–6na ascendentia firma linearia 6–12 lin. longa, ½–¾ lin. lata ad apicem et basin angustata firma glaberrima ascendentia. Flores hermaphroditi. Racemi 2–3 poll. longi, 5–6 lin. lati, interdum apice comati, pedicellis patentibus 1½–2 lin. longis, medio articulatis basi bracteis minutis deltoideis vel lanceolatis prædìtis. Perianthium 1–1½ lin. longum, segmentis flore expanso late patentibus. Antheræ minutissimæ filamento 3–4plo breviores. Bacca 3 lin. crassa. *Insula Zanzibar,* Hillebrand 1049! *Caput Bonæ Spei,* Hort. Upsal.! Thunberg! Villette! Nelson! Habitus et flores omnino *A. racemosi,* sed facile distinguitur phyllocladiis applanatis, distincte costatis.

92. A. GONOCLADOS, *Baker*.—A. Curillus, *Wall. Cat.* 5155 A. Suffrutex ramosissimus subscandens, caulibus primariis lævibus teretibus, ramulis firmis curvatis viridibus conspicue angulatis. Folia ramorum in spinas duras 3–6 lin. longas producta. Internodia suprema $1\frac{1}{2}$–3 lin. longa. Phyllocladia 2–6na ensiformia plana falcata ascendentia firmula unicostata viridia 9–12 lin. longa, $\frac{1}{2}$–$\frac{3}{4}$ lin. lata ad apicem angustata. Flores hermaphroditi, in racemos interdum fasciculatos vel obscure paniculatos 1–2 poll. longos dispositi. Pedicelli $\frac{1}{2}$–1 lin. longi, medio articulati, bracteis ovatis vel lanceolato-navicularibus suffulti. Perianthium $\frac{3}{4}$–1 lin. longum segmentis late patentibus. Antheræ minutissimæ filamento quadruplo breviores. Baccas non vidi. *Zeylania*, Thwaites! (racemis interdum comatis). *Madras*, Heyne! *Concan*, Law! *Neilgherries*, G. Thomson! Hook. et Thom. (Aspar. no. 12!).

93. A. CURILLUS, *Ham. in Roxb. Fl. Ind.* ii. 152; *Wall. Cat.* 5155 D, *non* A, B, C—A. volubilis, *Wall. Cat.* 5154 D, *ex parte*.—Asparagopsis Curilla, *Kunth, Enum.* v. 102. Suffrutex altus ramosissimus subscandens, ramis primariis gracilibus lignosis teretibus lævibus, ramulis inferioribus patentibus vel deflexis. Folia basi distincte calcarata, calcari lineari pungente sæpe 3–6 lin. longo. Internodia suprema $\frac{1}{2}$–1 lin. longa. Phyllocladia 3–6na linearia 2–3 lin. longa, $\frac{1}{4}$ lin. lata, plana vel subtriquetra ascendentia acuta. Flores hermaphroditi, in racemos laxos corymbosos parvifloros dispositi. Pedicelli 2 lin. longi medio articulati. Perianthium 1 lin. longum, segmentis late patentibus. Antheræ minutissimæ filamento quadruplo breviores. Baccas non vidi. *Himalayæ occidentalis et centralis regio subtropica, Kumaon*, Wallich! Royle! Thomson! Strachey et Winterbottom! *Luhrivar*, Edgeworth! *Nepaul*, Hamilton!

94. A. MEDEOLOIDES, *Thunb. Prodr.* 66; *Fl. Cap.* 333.—Dracæna medeoloides, *Linn. Suppl.* 203.—Medeola asparagoides, *Linn. Sp.* 484, *Mant.* 370; *Red. Lil.* t. 442.—Myrsiphyllum asparagoides, *Willd. Berl. Mag.* 1808, 25; *Kunth, Enum.* v. 205; *Bot. Mag.* t. 5584.—Ruscus volubilis, *Thunb. Prodr.* 13; *Fl. Cap.* 38; *Kunth, Enum.* v. 276. Herba late volubilis caulibus flexuosis pallide viridibus teretibus glabris, ramis et ramulis gracillimis flexuosis curvatis. Folia basi haud calcarata. Internodia suprema 3–6 lin. longa. Phyllocladia solitaria ovata acuta ascendentia vel patentia subcoriacea basi late rotundata vel cordata æqualiter distincte multistriata $\frac{3}{4}$–$1\frac{1}{2}$ poll. longa, infra medium 4–9 lin. lata. Flores hermaphroditi, ex axillis 1–4ni sæpissime gemini, pedicellis 5–6 lin. longis supra medium articulatis. Perianthium 2–$2\frac{1}{2}$ lin. longum, segmentis ligulatis e medio falcatis. Antheræ minutæ filamento 5–6plo breviores. Ovula in loculo 5–6. Bacca globosa 2–3 lin. crassa. *Caput Bonæ Spei*, Thunberg! Drège 2704 *b*, Burchell 1230! 2886! 3310! 3801! 5570

Hort. Gouan! Cooper 14! 188! 328! Zeyher 972! *In ditione Falu*, Dr. Sutherland! *Natal*, Gerrard 1523! *In Madeira introducta*, Bourgeau 1022! Mandon 315!—MEDEOLA ANGUSTIFOLIA, *Mill. Dict.* no. 2 (Myrsiphyllum angustifolium, *Kunth, Enum.* v. 106), ex exemplis in herb. Banks. anno 1779 in hort. Fothergill lecta, est forma hujus speciei phyllocladiis 8–9 lin. longis, duplo longioribus quam latis. M. FALCIFORME, *Kunth, Enum.* v. 107 (Drège 2704 *a*), est forma phyllocladiis acuminatis 1½ poll. longis triplo longioribus quam latis pedicellis solitariis. M. FALCIFORME, *Saund. Ref.* t. 47, est forma phyllocladiis paulo brevioribus pedicellis solitariis inter typum et plantam Kunthianam media.

95. A. KRAUSII, *Baker*.—Myrsiphyllum Krausianum et gramineum, *Kunth, Enum.* v. 107. Herba late volubilis ramis et ramulis gracillimis glabris. Folia basi haud calcarata. Internodia suprema ½–1 lin. longa. Phyllocladia solitaria lineari-lanceolata 9–15 lin. longa, infra medium 1½–2 lin. lata, acuminata firmula ascendentia vel patentia æqualiter 7–9-nervata. Flores hermaphroditi ex axillis cladodiorum solitarii pedicellis cernuis 2–3 lin. longis infra medium articulatis. Perianthium 2 lin. longum, segmentis flore expanso falcatis. Antheræ minutæ filamento 4plo breviores. *Caput Bonæ Spei*, Mundt! Krause 1333, Burchell 3282! 3248! 3861! Hutton!

96. A. VOLUBILIS, *Thunb. Prod.* 66.—Dracæna volubilis, *Linn. Suppl.* 204; *Schult. fil. Syst.* vii. 349. Herba late volubilis ramis et ramulis gracillimis flexuosis glabris. Folia basi haud calcarata. Internodia suprema 1–2 lin. longa. Phyllocladia solitaria lanceolata acuta patentia vel deflexa 6–15 lin. longa infra medium 1½–2 lin. lata distincte costata præter costam obscure striata marginibus conspicue incrassatis. Flores hermaphroditi, ex axillis phyllocladiorum 1–9ni pedicellis 1½ lin. longis supra medium articulatis. Perianthium 2–2½ lin. longum segmentis dimidio superiore falcatis. Antheræ minutæ, filamento 6–8plo breviores. *Caput Bonæ Spei*, Thunberg, Masson! Burchell 1361!

97. A. UNDULATUS, *Thunb. Prodr.* 66; *Flor. Cap.* 132.—Dracæna undulata, *Linn. Suppl.* 203; *Schult. fil. Syst.* vii. 346.—Myrsiphyllum undulatum, *Schlecht.*; *Kunth, Enum.* v. 109. Suffrutex parvus suberectus, caulibus robustis acute angulatis, ramis ascendentibus curvatis flexuosis crassis acute angulatis inter angulos profunde sulcatis. Folia basi haud calcarata. Internodia suprema 2–6 lin. longa. Phyllocladia solitaria ovato-lanceolata 6–12 lin. longa infra medium 3–4 lin. lata firma acuta curvata sæpe complicata utrinque æqualiter multistriata. Flores hermaphroditi, ex axillis cladodiorum 1–3, pedicellis 2–3 lin. longis medio articulatis. Perianthium 2 lin. longum segmentis ligulatis medio falcatis. Antheræ minutæ filamentis applanatis 4–6plo brevioribus. *Caput Bonæ Spei in aridis*, Thunberg! Oldenburg! Harvey!

Var. RUGOSUS, *Baker*. Forma reducta 3-4-pollicaris internodiis 1-1½ lin. longis, phyllocladia 3-4 lin. longis, 1½-2 lin. latis, ad carinas et margines scabro-denticulatis, pedicellis solitariis apice articulatis. *Caput Bonæ Spei*, Oldenburg! in herb. Mus. Brit.

Species imperfecte cognita.

98. A. MOZAMBICUS, *Kunth, Enum.* v. 72; *Peters, Mossamb. Bot.* 520. Caules cæspitosi erecti ramosissimi angulati striati virides glabri; rami patentes ramulique sulcato-acutanguli scabri. Folia infima basi deltoideo-calcarata. Cladodia 6-7 vel plura capillacea curvata sub 5-angulata glabra 6-7 lin. longa angulis vix scabriusculis, internodia 2-3plo superantia. Flores ignoti. *In ora Mozambica*, Dr. Peters in Herb. Imp. Berol.

Species exclusa.

ASPARAGUS MICRANTHUS, *Lindl.* (*Kunth, Enum.* v. 73), est CÆSIÆ species.

33. RUSCUS, *Tourn.*

Tourn. Inst. 79, t. 15; *Linn. Gen.* no. 1139; *Juss. Gen.* 42; *Endlich.* no. 1188 (*omnes ex parte*); *Kunth, Enum.* v. 273.

Flores polygami. *Perianthium* viridulum marcescens 6-partitum segmentis lanceolatis flore expanso patulis interioribus minoribus. *Stamina* 3, filamentis in tubum cylindricum connatis, antheris adnatis loculis divergentibus longitudinaliter dehiscentibus. *Ovarium* sessile uniloculare, biovulatum, stylo brevissimo, stigmate capitato. *Bacca* carnosa, semine sæpissime solitario turgido, albumine firmo, testa pallida. Flores masculi ovario minuto effœto, fœminei tubo cylindrico filamentorum ovarium cingente prædito. *Suffrutices erecti, foliis minutis scariosis bracteiformibus, phyllocladiis latis coriaceis persistentibus venosis sessilibus torsione basi horizontalibus, floribus parvis e costa faciei inferioris phyllocladiorum ortis, pedicellis apice articulatis foliis minutis scariosis basi bracteatis.*

1. R. ACULEATUS, *Linn. Sp.* 1474; *Miller, Ill.* t. 96; *Eng. Bot.* t. 560; *Reich. Ic. Germ.* t. 968; *Kunth, Enum.* v. 273. Suffrutex erectus copiose ramosus 1-2-pedalis. Phyllocladia rigide coriacea oblonga mucronata omnia alterna 9-12 lin. longa distincte costata venis lateralibus curvatis venulis occultis. Folia ad basin phyllocladiorum minuta deltoidea vel lanceolata. Flores 1-2 infra medium phyllocladiorum impositi, costa in bracteam firmam lanceolatam desinente, pedicellis bracteis scariosis minutis cinctis. Perianthium ¾-1 lin. longum,

segmentis interioribus multo minoribus. Bacca rubra magnitudine cerasi. *Per Europam totam, insulæ Fortunatæ, Caucasus, Syria.*

2. R. HYPOPHYLLUM, *Linn. Sp.* 1474; *Lam. Encyc.* ii. 526; *Bot. Mag.* t. 2049; *Dill, Elth.* t. 251; *Kunth, Enum.* v. 275. Suffrutex erectus 1–1½-pedalis caule sæpissime simplici. Folia ad basin phyllocladiorum lanceolata scariosa 3–6 lin. lata. Phyllocladia subcoriacea oblonga vel oblongo-lanceolata 3–5 poll. longa, superiora alterna, inferiora opposita vel ternata vel verticillata, distincte costata, venis ascendentibus e costa ortis, venulis ultimis reticulatis. Flores 5–6 in umbellam dispositi e medio costæ sæpissime faciei inferioris phyllocladiorum orti, costa in bracteam minutam firmam subscariosam desinente, pedicellis 3–4 lin. longis, basi bracteis scariosis cinctis. Perianthium 2 lin. longum. Bacca rubra 6–9 lin. crassa. *Insulæ Fortunatæ, regio Mediterranea, Austria, Caucasus.*

Var. HYPOGLOSSUM, *Lam.*—Ruscus Hypoglossum, *Linn. Sp.* 1474; *Sibth. & Sm. Fl. Græc.* t. 955; *Reich. Ic. Germ.* t. 969; *Kunth, Enum.* v. 275. Costa sub umbellam in bractea magna foliacea textura omnino phyllocladii desinens. *Distributio formæ typicalis.*

Species exclusæ.

RUSCUS VOLUBILIS, *Thunb.*! = Asparagus medeoloides.

RUSCUS RETICULATUS, *Thunb.* = Hylonome reticulata, *Webb,* genus foliis propriis phyllocladiis nullis præditum.

34. SEMELE, *Kunth.*

Kunth, Enum. v. 277.—Danae, sectio Salmacis, *Webb, Phyt. Can.* iii. 320, t. 224 A.—Amphion, *Salisb. Gen.* 66.—Ruscus, sp., *Linn. &c.*

Flores leviter polygami. *Perianthium* viridulum 6-partitum, segmentis lanceolatis, flore expanso patulis. *Stamina* 6 filamentis in tubum cylindricum connatis, antheris bilocularibus lobis contiguis. *Ovarium* sessile subglobosum triloculare, ovulis in loculo geminis collateralibus; stylus brevis; stigma capitatum. *Bacca* globosa, seminibus sæpe solitariis, albumine corneo, testa brunnea.

1. S. ANDROGYNA, *Kunth, loc. cit.*.—Ruscus androgynus, *Linn. Sp.* 1454; *Sims, Bot. Mag.* t. 1898; *Hook. Bot. Mag.* t. 3029.—Danae androgyna *et* Gayæ, *Webb & Berth. Phy. Can.* t. 224. Suffrutex glaberrimus alte scandens copiose ramosus. Folia ad basin phyllocladiorum minuta scariosa. Phyllocladia alterna vel inferiora opposita ovata vel lanceolata subsessilia rigide subcoriacea persistentia acuminata 3–4 poll. longa crebre graciliter æqualiter multinervata, nervulis

immersis brevissimis reticulatis. Flores multi (6–20) in umbellas solitarias vel paucas e margine vel raro e facie phyllocladiorum orti, pedicellis 1½–4 lin. longis apice articulatis, basi bracteis minutis scariosis suffultis. Perianthium 1½ lin. longum. *Insulæ Canarienses.* De formis vide Sims, Bot. Mag. sub t. 1898.

35. DAÑAE, *Medic.*

Medic. Malv. 71; *Moench, Meth.* 179; *Kunth, Enum.* v. 277; *Salisb. Gen.* 66.—Danae, sectio Acrisia, *Webb, Phyt. Can.* iii. 320.—Danaida, *Link, Handb.* i. 274.—Ruscus, sp., *Linn. &c.*

Flores hermaphroditi. *Perianthium* carnosum limbo gamophyllo globoso, dentibus deltoideis erectis æqualibus. *Stamina* 6, filamentis in tubo supra medium perianthii orto connatis, antheris 6 contiguis e fauce tubi protrusis. *Ovarium* sessile globosum imperfecte triloculare, ovulis in loculo geminis collateralibus, stylus brevis; stigma capitatum. *Bacca* globosa carnosa seminibus sæpe solitariis, albumine firmo, testa pallide brunnea.

1. D. RACEMOSA, *Moench, Meth.* 170; *Kunth, Enum.* v. 277.—Danaida racemosa, *Link, loc. cit.*—Ruscus racemosus, *Linn. Sp.* 1474; *Gærtn. Fruct.* i. 60, t. 16. fig. 8. Suffrutex erectus copiose ramosus glaberrimus ramulis virgatis. Folia ad basin phyllocladiorum minuta lanceolata scariosa. Phyllocladia lanceolata alterna subsessilia subcoriacea 2–3 poll. longa acuminata æqualiter tenuiter multinervata venulis transversalibus occultis. Flores ad apices ramulorum in racemum ex axilla phyllodii supremi ortum dispositi. Racemus 6–18 lin. longus, 3-4 lin. latus. Pedicelli solitarii 1–1½ lin. longi erecto-patentes apice articulati. Perianthium 1½–2 lin. longum. Bacca magnitudine cerasi. *Græciæ archipelagus, Caucasus, Persia borealis.*

DESCRIPTION OF PLATES.

PLATE XVII. *Speirantha convallarioides*, Baker.

Fig. 1. Whole plant: life-size.
2. Single flower: magnified.
3. Pistil: magnified.

PLATE XVIII. *Plectogyne variegata*, Link.

Fig. 1. Portion of 8-fid perianth, viewed from outside.
2. Inside view of one segment of perianth—showing side lamellæ, central groove, and anther.

3. Lateral view of one segment of perianth, to show character of lamella and stamen.
4. Perianth cut open, showing pistil and stamens.
5. Stigma, from above, to show eight troughs and papillose central umbilicus.
6. Stigma, viewed from beneath, to show slits and recurved borders of troughs inflexed beneath.

All more or less magnified.

PLATE XIX. *Gonioscypha eucomoides*, Baker.

Fig. 1. Raceme with portion of scape: size of life.
2. Upper part of leaf: life-size.
3. Perianth opened out: magnified.
4. Pistil: magnified.

PLATE XX. *Campylandra aurantiaca*, Baker.

Fig. 1. Plant: life-size.
2. Perianth opened out: magnified.
3. Pistil: magnified.
4. Horizontal section of ovary: magnified.

Note to Mrs. MERRIFIELD's Communication on *Nitophyllum versicolor*.

THE following extract from a letter written by Mrs. Merrifield to the Secretary should have been appended to that lady's communication on *Nitophyllum versicolor* (pp. 421–423).

"I think you will be interested to know that Miss Giffard has a plant of *Nitophyllum versicolor* from the Mediterranean bearing tetrasporic fruit. From the position of the tetrasporic fruit, the place of the plant in the genus should probably be near to *N. multipartitum* and *N. pristoideum* (see Agardh's 'Bidrag till Florideernes Systematik'). How far this arrangement may be modified by the calli found on some fronds remains yet to be determined. In the mean time it is a satisfaction that both capsular and tetrasporic fruit have been discovered."

INDEX.

Page

Acrostalagmus fulvus 138
Æcidium Argyreiæ 94
—— ceracium 94
—— Chionanthi 95
—— desmium 95
—— Dioscoreæ 95
—— erythrobasis 94
—— flavidum 95
—— Hiptages 94
—— miliare 95
—— nummulare 95
—— Pavettæ 95
—— rhytismoideum 95
—— umbilicatum 95
Ægerita mellea 101
Africa, East, on the subalpine vegetation of Kilima Njaro 141
Africa, South, changes going on in the vegetation of, through the introduction of the Merino sheep. 202
Agaricus Moselei 353
—— pedilius 32
—— pezizula 32
—— poderes 32
—— reversus 32
Ailographum intricatum . . . 133
Alectoria epichrysa 367
Algæ collected at the Cape-Verde Islands 344
—— collected at St. Paul's Rocks. 355
—— from Bahia 377
—— from Fernando de Noronha . 363
—— from Inaccessible Island . . 386
—— from Tristan d'Acunha . . 384
—— of Mauritius 190
——, freshwater, obtained at the boiling springs at Furnas, St. Michael's, Azores . 321, 326, 328
——, marine, of Barbadoes . . . 146
——, marine, of St. Thomas and the Bermudas 311
Alwisia Bombarda 87
Amsterdam Island, on the discovery of *Phylica arborea* in . . 474

Page

Angolæa fluitans 210
Anthina cinnabarina 97
Aristolochia, on the structure, affinities, and distribution of the genus 487
—— imbricata 494
—— pannosa 493
—— Pearcei 493
—— ungulifolia 494
Arthonia perangusta 470
—— velata 372
Artocreas Micheneri 73
—— poroniæforme 73
Aschersonia mellea 89
—— placenta 89
Ascidium elatius 466
Ascobolus foliicola 109
—— leiocarpus 109
Asparagaceæ, Clavis tribuum et generum 520
——, Revision of the genera and species of 508
Asparagus, sections and species of 594-629
—— Burchellii 618
—— Burkei 607
—— capitatus 607
—— Chesneyi 603
—— consanguineus 615
—— Cooperi 613
—— dumosus 608
—— Eckloni 615
—— flagellaris 614
—— Griffithii 604
—— irregularis 620
—— Jacquemonti 615
—— Lownei 601
—— Macowani 609
—— microraphis 612
—— minutiflorus 616
—— monophyllus 604
—— multiflorus 610
—— Nelsoni 617
—— oligophyllus 604

Page
Asparagus oxyacanthus 625
—— palæstinus 602
—— persicus 603
—— pilosus 610
—— plumosus 613
—— ramosissimus 622
—— Rottleri 611
—— rubricaulis 616
—— Schweinfurthii 616
—— simulans 609
—— stellatus 612
—— zanzibaricus 614
Aspergillus flavidus 101
Aspidistra, character of 579
Asterina micropeltis 132
—— nubecula 132
—— Pleurostyliæ 132
Astrothelium prostratum . . . 473
Azores, freshwater Algæ obtained at Furnas, St. Michael's, 321, 326, 328
——, Lichens from the 373

Bactridium clavatum 90
Bæomyces arcuatus 460
—— granosus 460
—— pertenuis 460
—— subgranosus 460
Baghdad, vegetable productions and rural economy of the province of 399
Bahia, Enumeration of Algæ from 377
Barbadoes, marine Algæ of . . . 146
Bermuda, Fungi collected at . . 351
——, Lichens collected in . . . 369
—— notes on the vegetation of . 317
Bermudas, marine Algæ of the . 311
Boletus portentosus 46
Boschia acutifolia 503
—— grandiflora 502
Bovista velutina 78
Bracts of Crucifers, Note on the . 391
Burasaia Vitis 4
Callixene, species of 592, 593
Calochortus, subgenera and species of 302–310
Calochortus apiculatus 305
—— Lyallii 305
Campylandra, character of . . . 582
Campylopus falcifolius 481
Cantharellus elegans 33
—— humilis 33
—— inæqualis 33
—— rubidus 33
Cape flora, limits of the 482
Cape-Verde Islands, Algæ collected at the 344
—— —— ——, Lichens collected in the 366
Cape-Verde Islands, Notes on plants collected at St. Vincent . . . 340
Carex, perigynium and seta of . . 154
Carex pulicaris, development of the perigynium in 152
Ceratium arbuscula 97
—— filiforme 97
'Challenger,' Contributions to the Botany of H.M.S. 311
Chiodecton conchyliatum . . . 471
—— moniliatum 472
—— sinuosum 472
Chlorococcum ellipticum . . . 348
Cinchona, on the genus 156
Cissampelos Vitis 4
Cladoderris Thwaitesii 63
Cladophora minuta 365
—— pannosa 200
—— pinnata 200
—— subvaricosa 365
Cladosporium apicale 99
—— calamigena 99
—— congestum 99
Clathrus delicatus 77
Clavaria chlorina 76
—— echinospora 75
—— flammans 350
—— læta 76
—— megalorhiza 75
—— semivestita 75
—— Thwaitesii 75
—— xylogena 76
Clintonia, species of . . . 583–585
Cohnia, species of 545, 546
Cohnia neocaledonica 546
Comassi, Note on a fruit from . . 459
Convallaria, species of 552
Cordiceps Barnesii 110
—— dipterigena 111
—— myrmecophila 111
Cordyline, subgenera and species of 538–544
Corticium alopecinum 70
—— ambiens 72
—— apalum 72
—— chlorascens 70
—— emplastrum 70
—— flavo-rubens 72
—— Habgallæ 72
—— hypochnoideum 71
—— lilacinum 70
—— modestum 69
—— murinum 70
—— muscigenum 71
—— Peradeniæ 69
—— peroxydatum 70
—— reticulatum 69
—— rhabarbarinum 69

	Page
Corticium salmonicolor	71
—— scariosum	71
—— sparsum	72
—— simulans	72
—— suffultum	72
—— tenuissimum	71
—— tristiculum	71
Crawfurdia luteo-viridis	443
—— puberula	442
Crucifers, Note on the bracts of	391
Cyphella disseminata	74
—— epileuca	74
—— parasitica	74
—— pruinosa	74
—— pulchra	74
—— reticulata	74
—— spermoides	74
—— versicolor	73
Dacrymyces furcifer	77
Dædalea subsulcata	56
Danaë, character of	631
Dasya obscura	384
Dialycarpa Beccarii	505
Dianella, species of	574–579
Diatrype chlorosarca	123
—— griseo-tecta	124
—— irpex	124
—— pithodes	124
—— russodes	123
—— theloides	123
Dictyota cuneata	356
Diderma sublateritium	82
Didymium bulbillosum	84
—— commutabile	83
—— croceo-flavum	84
—— leoninum	83
—— melleum	83
—— neglectum	83
—— zeylanicum	84
Dinemasporium gelatinosum	88
Diplodia Cathartocarpi	87
—— circinans	87
—— radula	87
Disporum, species of	588–590
Dothidea aspidea	134
—— Barringtoniæ	136
—— calamigena	135
—— Calophylli	136
—— dolichigena	135
—— edax	135
—— Elettariæ	134
—— microcenta	134
—— orbis	133
—— Osbeckiæ	134
—— phaselina	135
—— stenospora	134
—— Tetradeniæ	136
Dothidea Tetrantheræ	135
Dracæna, species of	523–538
Dracæna Afzelii	536
—— cameroniana	538
—— densiflora	535
—— glomerata	536
—— humilis	534
—— Kirkii	525
—— Mannii	526
—— Perottetii	528
Drymophila Moorei	571
Durio carinatus	500
—— lanceolatus	499
—— lissocarpus	501
—— oblongus	500
Durioneæ, Monographic sketch of	495
Endocarpiscum aterrimum	366
Ephelis brevis	89
Epichloe cinerea	111
—— pulvinulus	111
Erythronium, species of	296–299
Eurotium diplocystis	137
Eustrephus, character of	572
Exacum Beddomei	427
Favolus ruficeps	57
—— scaber	57
Fernando de Noronha, Enumeration of Algæ from	363
—— —— ——, Lichens from	375
—— —— ——, Notes on plants collected at	359
Ferns, Brazilian, recent synonyms of	12
Fritillaria, subgenera and species of	251–273
Fritillaria assyriaca	265
—— bithynica	264
—— Forbesii	264
—— Hookeri	269
—— Olivieri	261
Fungi collected during the expedition of H.M.S. 'Challenger,' enumeration of	350
—— of Ceylon, enumeration of the	29
Furnas Lake, Azores, containing Algæ and a few other organisms, Notes on	328
Fusidium Cratævæ	98
—— fasciculatum	98
—— pulvinatum	98
—— squamicola	98
Fusisporium pulvinatum	102
Galaxaura Pikeana	195
Garcinia, Observations on some Indian species of	484

Page

Geitonoplesium, character of . . . 571
Gentiana Andersoni 436
—— crassa 440
—— Falconeri 433
—— Stoliczka 433
Gentianaceæ, Indian, Notes on . 423
——, ——, Tables of geographical distribution of 451–457
Glonium orbiculare 133
Gonioscypha eucomoides 581
Grandinia lateritia 61
—— papulosa 61
Graphium curvulum 100
Graphis nematodes 372
Guatemala, letter from 188
Guepinia cochleata 73
Gymnosporium cinctum 90
—— circumscissum 90
—— confusum 90
—— lineare 90

Hæmatomyces spadiceus 108
Helicoma binale 100
Heliomyces Caryotæ 41
Helminthosporium Arecæ 98
—— atropurpureum 98
—— calcioideum 98
—— gigasporum 98
Helotium agaricola 107
—— alutaceum 107
—— fasciculare 107
—— lentum 108
—— melleum 107
—— rufo-corneum 108
Hemileia Canthii 93
Hendersonia constricta 88
—— Symploci 88
Hexagona adnata 57
—— durissima 57
—— pergamenea 57
Hieracium silhetense, *DC.*, on . . 410
Hildenbrandtia expansa 357
Hormospora pellucida 365
Hormotrichum delicatulum . . . 200
Hydnocystis Thwaitesii 110
Hydnora americana, on 182
Hydnum ambiguum 60
—— gilvum 59
—— glabrescens 59
—— hypochrum 60
—— hypoleucum 60
—— polymorphum 59
—— pronum 59
—— subvinosum 60
—— Thwaitesii 58
—— versicolor 59
Hydrotrophus, g. n. 8
Hylonome, species of 561

Page

Hymenochæte crocicreas 68
—— dendroidea 69
—— depallens 68
—— floridea 68
—— pellicula 68
—— ramealis 68
—— spadicea 68
—— strigosa 68
Hyphomyces chromaticus 113
—— chrysostomus 113
—— pæonius 113
—— stilbiger 113
Hypochrea albo-fulva 113
—— artocreas 111
—— Bambusæ 113
—— catoptron 112
—— corticioides 111
—— deplanata 111
—— discella 111
—— discoidea 113
—— fusigera 112
—— jecorina 112
—— multiformis 112
—— palmicola 112
—— pezizoides 112
Hypoxylon anthochroum 122
—— ceramichroum 120
—— chalybeum 121
—— chrysoconium 121
—— congestum 120
—— deciduum 120
—— discolor 123
—— distillatum 121
—— lycogaloides 120
—— murcidum 123
—— niphidium 122
—— oodes 122
—— quisquilliarum 121
—— subgilvum 120
—— trugodes 122
—— umbrinellum 123
—— vividum 122
Hysterium atramentarium 133
—— Drynariæ 133
—— Fourcroyæ 132

Inaccessible Island, Algæ from . . 386
Indian Gentianaceæ, Notes on . . 423
Irpex colliculosus 61
—— depauperatus 61
—— vellereus 61
Isaria arcyrioides 96
—— aurantiaca 96
—— congesta 96
—— congregata 96
—— pulcherrima 96

Jæschkea latisepala 441

Page
Kallonema cæspitosum 348
—— obscurum 365
Kerguelen's Land, botany of 387, 389
Kneiffia chromo-plumbea 62
—— coriacea 62
—— discolor 62
—— insularis 62
—— isabellina 62
Kruhsea, character of 593

Lachnocladium rameale 67
Laschia cæspitosa 58
—— pustulata 58
—— Thwaitesii 58
Lecanora chrysosticta 462
—— flavopallida 463
—— inclinans 463
—— noseriza 374
—— recubans 375
—— vallata 463
Lecidea ——? 369
Lecidea aleuroides 469
—— caliginosa 371
—— campylospora 467
—— ceratina 468
—— concinnior 469
—— cyanochroa 373
—— epipasta 368
—— epiphysa 468
—— euporiza 371
—— fuscocincta 470
—— implicata 466
—— insidens 470
—— kelica 467
—— maculosa 470
—— nidulans 469
—— nubilior 469
—— revertens 372
—— rubricatula 468
—— semiusta 371
—— teichiodes 368
—— thyrsodes 368
—— Wellingtonii 469
Lentinus apalus 45
—— cretaceus 42
—— estriatus 44
—— eximius 44
—— infundibuliformis 42
—— lobatus 44
—— manipularis 43
—— multiformis 42
—— percomis 42
—— radicans 44
—— similis 43
—— velatus 42
—— zonifer 43
Leotia brunneola 102
Liagora crassa 195
—— galaxauroides 195

Page
Liagora lurida 195
—— obtusa 195
Licea cinnabarina 86
—— reticulata 86
—— tenuissima 86
Lichens collected by H. N. Moseley, M.A., Naturalist to H.M.S. Challenger, in the islands of the Atlantic Ocean 366
Lichen-flora of New Zealand, Additions to the 458
Liliaceæ, Revision of the suborder Asparagaceæ 508
——, tribus Tulipeæ, revision of the genera and species of 211
Lilium, subgenera and species of 225–251
Lloydia, subgenera and species of 299–301
Lomatophyllum, species of . 550, 551
Luzuriaga, species of . . . 573, 574
Lyallia kerguelensis, *Hk. f.*, Note on 390
Lycogala affine 81
—— atropurpureum 82
—— nitidum 81
Lycoperdon citrinum 80
—— conspurcatum 80
—— echinulatum 80
—— Gardneri 79
—— gautieroides 79
—— phlebophorum 79
—— rubecula 80
Lyngbya Noronhæ 365
—— olivacea 201
—— plana 201
Maianthemum, character of . . 563
Malaxis, buds developed on the leaves of 1
——, supplemental note on buds of 180
Marasmius actinophorus 39
—— calvus 34
—— chondripes 36
—— confusus 40
—— confertus 34
—— coniatus 35
—— cornicolor 36
—— corticigena 40
—— crispatus 35
—— eximius 38
—— epochnous 41
—— florideus 39
—— hemibaphus 39
—— hirtellus 39
—— hypochroides 35
—— ignobilis 40
—— inustus 39
—— mutabilis 37

Page
Marasmius nummularius 33
—— obscuratus 38
—— ochraceus 34
—— pellucidus 35
—— prasinus 38
—— proximus 37
—— radians 37
—— rivulosus 38
—— rotalis 40
—— rufescens 41
—— semipellucidus 36
—— subaurantiacus 36
—— subcinereus 37
—— Thwaitesii 39
—— umbraculum 36
Marion Island, botany of . . 387, 389
Mastigocladus Bursa 201
Mauritius, Algæ of 190
Medeola, character of 583
Melanconium melanoxanthum . . 89
Melanospora chrysomalla . . . 130
Melaspilea amphorodes 471
Meliola mollis 136
Merulius similis 58
—— versiformis 58
Microcladia Moseleyi 385
Micropeltis asterophora 131
—— gomphispora 132
—— granulata 132
Monatospora fusigera 99
—— Oryzæ 99
Mosses of the Island of St. Paul . 480
Mucor artocarpi 137
Myrosporium rufum 88

Nectria aurantiicola 117
—— bactrioides. 115
—— Bambusæ 115
—— bicolor 116
—— byssicola 116
—— dealbata 117
—— flavo-lanata 114
—— fuliginosa 116
—— hæmatococca 116
—— monilifera 114
—— pulcherrima 116
—— rigidiuscula 116
—— sternospora 115
—— subquaternata 116
—— trichospora 115
—— villigera 115
—— volutelia 115
Neesia strigosa 504
Nemacladus ramosissimus . . . 29
Nematella guttæformis 77
Neomeris annulata 198
Nephrodium (Lastrea) antarcticum 479
New Zealand, additions to the Lichen-flora of 458

Page
Nitophyllum versicolor, Observations on the fruit of 421, 632
Nostoc purpureum 201

Odontotrema concentricum . . . 466
Œdemium sparsum 100
Oidium gilvum 100
Opegrapha undulata 369
Oscillaria sordida 358

Pannaria crustata 462
—— perfossa 462
—— variegata 461
Panus coriaceus 45
—— crassiusculus 45
—— glandulosus 45
Patellaria applanata 108
—— hirneola 108
—— stictoides 109
—— violacea 108
—— viridi-rufa 108
Paurocotylis fragilis 137
—— fulva 137
Pemphidium dilatatum 131
Penicillium incarnatum 101
Periconia monilifera 99
—— rigida 99
Pertusaria circumcincta 464
Pestallozzia congesta 89
Peziza alligata 107
—— apicalis 106
—— atro-citrina 106
—— cæsio-lutea 106
—— crenulata 104
—— Dorcas 106
—— earoleuca 105
—— emarginata 104
—— epispartia 103
—— flavo-tingens 104
—— Harmoge 104
—— hysterigena 106
—— læticolor 104
—— lechria 103
—— melaneres 106
—— Oncospermatis 105
—— radiculosa 103
—— ruberrima 104
—— russa 105
—— sarmentorum 102
—— simillima 105
—— Ustorum 104
—— verruculosa 105
Phasiola minuta 358
Phlyctis oleosa 464
—— subuncinata 464
—— uncinata 464
Phoma hysterioideum 89
—— Lobeliæ 89
—— pelliculosum 89

Page
Phylica arborea, on the discovery of, in Amsterdam Island . . . 474
Physarum roseum 84
—— rufibasis 85
Pilacre depressa 100
—— orientalis 101
—— sphærocephala 101
—— tephrospora 101
Piptostoma spilotum 131
Platygrapha albo-rufa 110
—— astroidea 109
—— bivela 109
—— magnifica 110
—— subreticulata 109
Plectogyne, character of 580
Plocamium biserratum 346
Podostemaceæ, on a new African genus of 208
Polycystis macularis 94
Polygonatum, species of . . 552–561
—— brevistylum 556
—— Cathcartii 559
—— Griffithii 558
—— Hookeri 558
Polyporus acupunctatus 52
—— appendiculatus 48
—— calceus 55
—— cartilagineus 49
—— dissitus 48
—— diversiporus 53
—— dochmius 50
—— epilinteus 50
—— epimiltinus 54
—— eurocephalus 48
—— fuligo 53
—— hemicapnodes 47
—— hydnophorus 54
—— interruptus 55
—— Kermes 49
—— leptodermus 54
—— melleus 53
—— Menziezii 47
—— niphodes 55
—— olivaceo-fuscus 46
—— Peradeniæ 51
—— personatus 51
—— phocinus 52
—— polytropus 49
—— Ravenalæ 53
—— russiceps 48
—— subvinctus 54
Prosartes, species of 586, 587
Protococcus affinis 358
Psilonia penicillata 102
Psoroma athroophyllum 461
—— implexum 461
Puccinia Abutili 91
—— congesta 91
Puccinia flaccida 91
—— spongiosa 91
—— Thwaitesii 91
—— Tremandræ 91
Pyrenopsis pelia 366
Pysomyxa Amomi 138

Radulum mirabile 61
Ramalina aulota 374
—— bermudiana 370
—— scopulorum, var. tenuior . . 367
Ravenelia aculeifera 93
—— indica 93
—— macrocystis 93
—— sessilis 93
—— stictica 93
Reineckia, species of 551
Restiaceæ, on the, of Thunberg's herbarium 413
Reticularia apiospora 82
—— fuliginosa 82
—— lurida 82
—— polyporiformis 352
Rhinotrichum globiferum . . . 101
Rhipilia Rawsoni 151
Rhizina reticulata 102
—— Thwaitesii 102
Rhytisma constellatum 131
—— filicinum 130
—— maculosum 130
—— placenta 131
—— Pongamiæ 130
—— Pterygotæ 131
—— spurcatum 131
Roccella patellata 366
Rohdea, character of 582
Rural economy of Baghdad . . . 399
Ruscus, character of 629

St. Iago, Cape-Verdes, Fungi collected at 353
St. Michael's, freshwater Algæ from, 321, 326, 328
St. Michael's, Fungi collected at . 352
St. Paul, Mosses of the Island of . 480
St. Paul's Rocks, Enumeration of the Algæ collected at 355
——, Notes on plants collected at . 354
St. Thomas, Fungi collected at . 352
——, marine Algæ of 311
St. Vincent, Cape-Verdes, Notes on plants collected at 340
——, Fungi collected at 353
Sanseviera, species of . . . 546–549
Sanseviera nilotica 548
—— senegambica 548
Sclerocystis coremioides . . . 137
Scleroderma columnare 80

	Page
Sebæa khasiana	428
Semele, character of	630
Septonema olivaceo-nigrum	90
Speirantha, character of	562
Sphæria acanthigera	127
—— agnocystis	128
—— bihyalina	124
—— bothrina	125
—— bunodes	125
—— catervaria	127
—— Chionanthi	128
—— chloronema	126
—— cirrhostoma	126
—— Cleidionii	129
—— emergens	125
—— Eterio	129
—— epixantha	129
—— hemipsila	126
—— hypoleuca	129
—— Hystricula	125
—— imitatrix	124
—— Janus	127
—— lignyodes	128
—— nesodes	129
—— nigrita	125
—— pachythele	128
—— Pandanicola	129
—— penes	128
—— perusta	130
—— plicatula	128
—— regulina	126
—— rhodosticta	126
—— rhypara	127
—— Rottleræ	130
—— tephrocoma	126
—— Tetradeniæ	126
—— Vesuvius	127
—— xanthotricha	127
Sphærobolus rubidus	81
Sphæropsis annularis	88
—— anomala	87
—— Diospyri	88
—— seminicola	88
Sphærostilbe repens	114
—— variabilis	114
Sporodium effusum	100
Sporotrichum lichenicola	102
Squamaria thaumasta	462
Stereum albocinctum	66
—— annosum	67
—— duriusculum	66
—— endoleucum	66
—— insulare	66
—— Lepra	67
—— notatum	66
—— partitum	65
—— percome	65
—— ruberrimum	67

	Page
Stereum subpurpurascens	66
—— tuba	65
Sticta hirta	461
Streptopus, species of	590–592
Streptopus brevipes	592
Struvea ramosa	316
Stylbum clavula	97
—— compressum	97
—— graphoideum	97
—— rhytidospora	96
Symphoricarpus, Revision of the genus	9
Symphoricarpus longiflorus	12
—— oreophilus	12
Teneriffe, Fungi collected at	350
——, Lichens from	374
Thamnochortus erectus	419
Thecaphora inquinans	94
Thelenella wellingtonii	473
Thelephora accumbens	65
—— atropurpurascens	64
—— arachnoidea	64
—— capnodes	63
—— cristatella	63
—— dictyodes	63
—— floridea	64
—— lichenicola	64
—— subcarbonacea	64
—— submembranacea	64
—— suffulta	63
—— Thwaitesii	64
Thelotrema hians	465
—— obovatum	465
Theropogon, species of	562
Thunberg's herbarium, on the Restiaceæ of	413
Tovaria, species of	564–570
Tovaria laxiflora	569
—— nervulosa	569
—— oligophylla	565
—— Salvini	567
—— sessilifolia	566
—— thyrsoidea	568
Trametes rugosa	55
—— versiformis	56
Tremella indurata	77
—— scutellæformis	77
Tremotylium occultum	465
—— suboccultum	465
Trichia Thwaitesii	86
Triphragmium clavellosum	92
—— Thwaitesii	92
Triposporium Gardneri	99
Tristan d'Acunha, Algæ from	384
Tristan d'Acunha group, Notes on plants collected in the islands of the	377

Page
Trogia bicolor 46
—— infundibuliformis 45
Tuber zeylanicum 110
Tulipa, subgenera and species of 275–296
—— fulgens 285
—— Lownei 294
—— maculata 289
—— microgyna 292
Tulipeæ, clavis generum 224
——, Revision of the genera and species of 211
Tupistra, character of 580

Uredo Artocarpi 93
—— Dolichi 92
—— Ruelliæ 92
Uromyces Blainvilleæ 92
—— linearis 92

Page
Uromyces Thwaitesii 92
—— verruculosa 92
Ustilago spermoidea 94

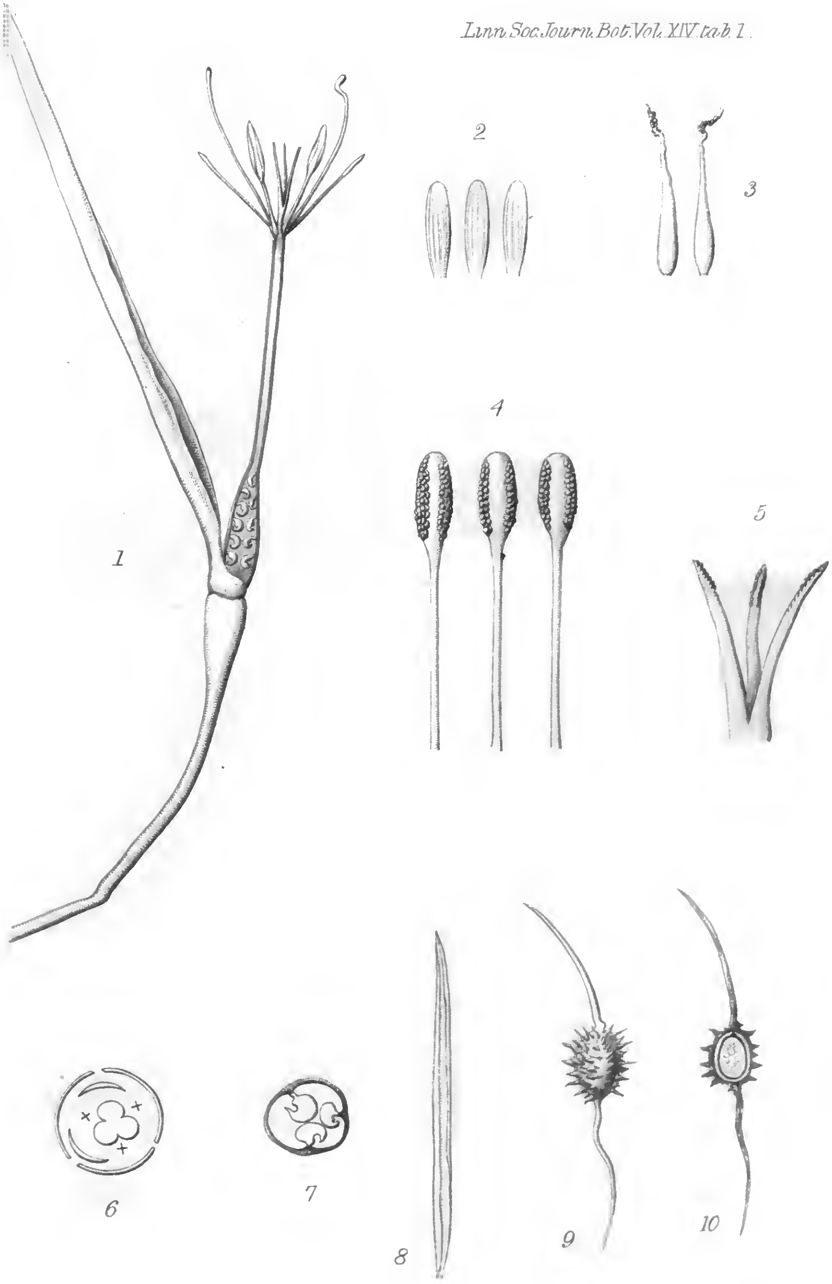
Valonia filiformis 198
Verrucaria beloniza 472
—— cyrtospora 472
—— leptiza 472

Xerotus tener 45
Xylaria Culleniæ 119
—— exalbata 119
—— Gardneri 118
—— hæmorhoidalis 117
—— pyramidata 118
—— spathulata 118

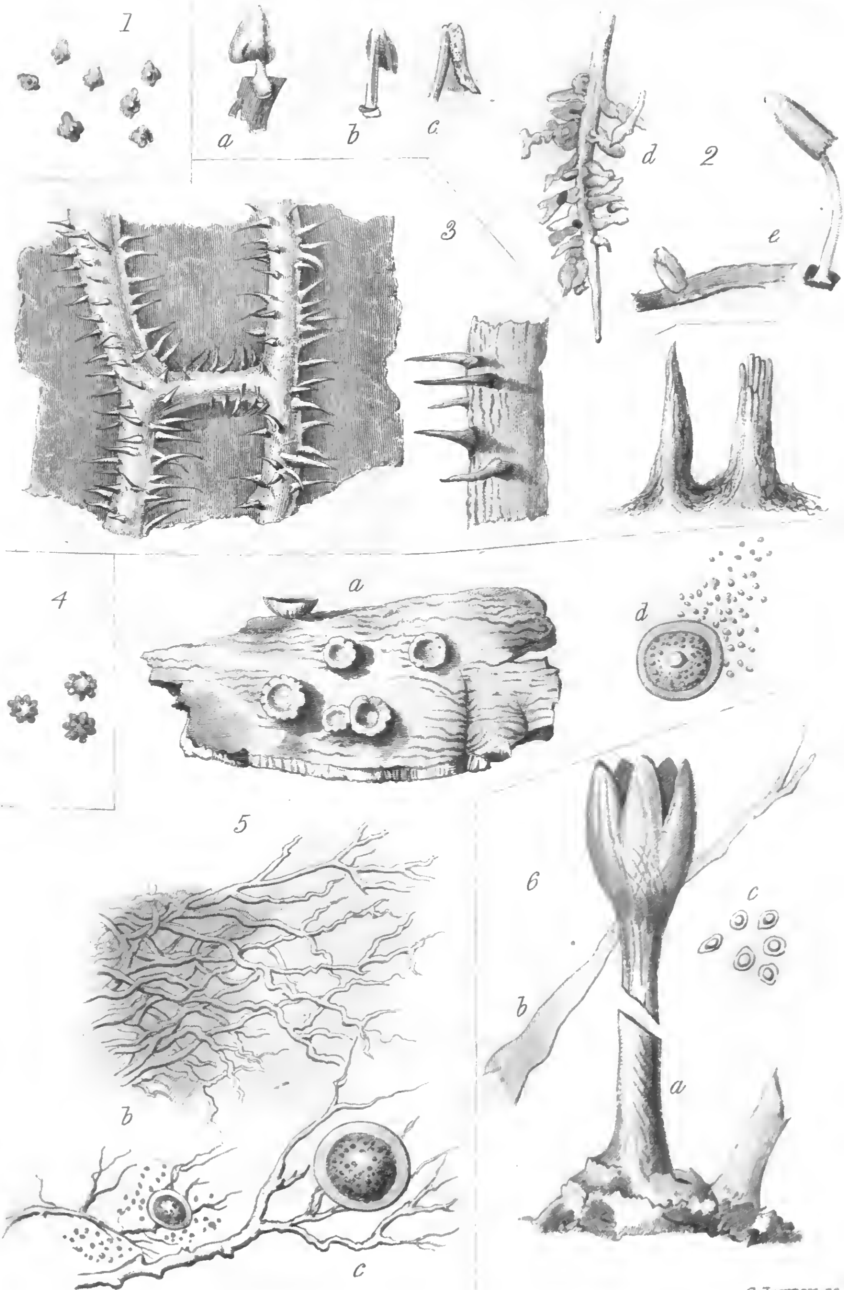
Yong Island, botany of . . 387, 389

END OF THE FOURTEENTH VOLUME.

PRINTED BY TAYLOR AND FRANCIS, RED LION COURT, FLEET STREET.

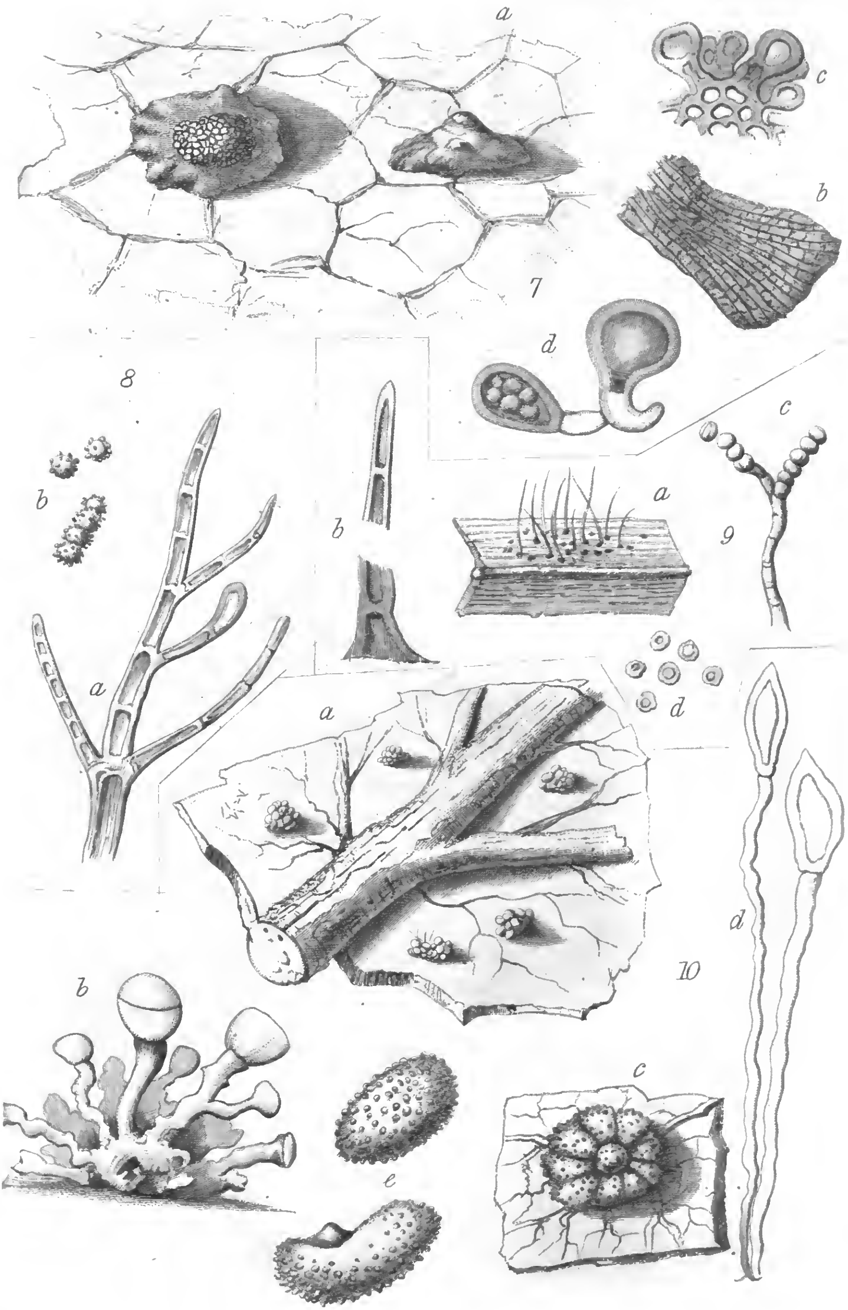


G. Jarman sc



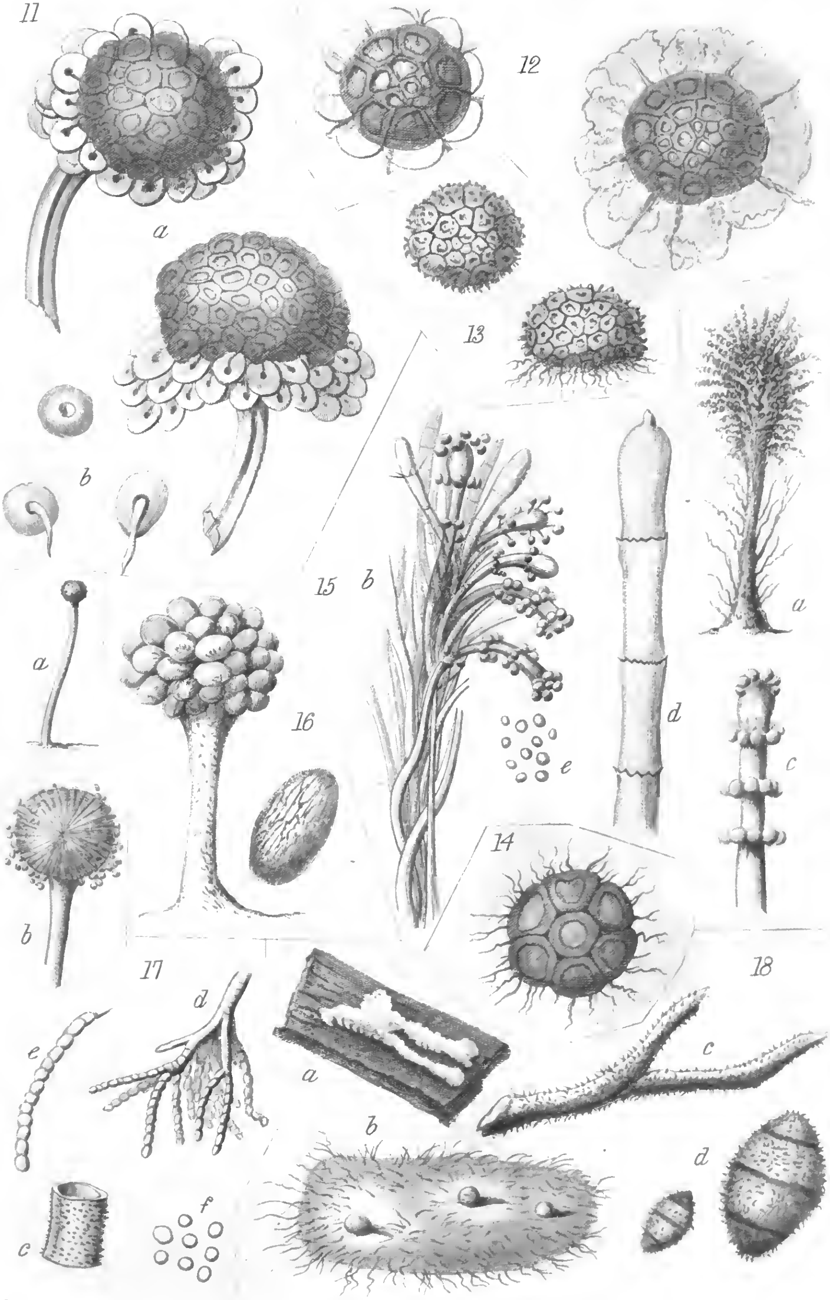
C.E.B. del.

G. Jarman sc.



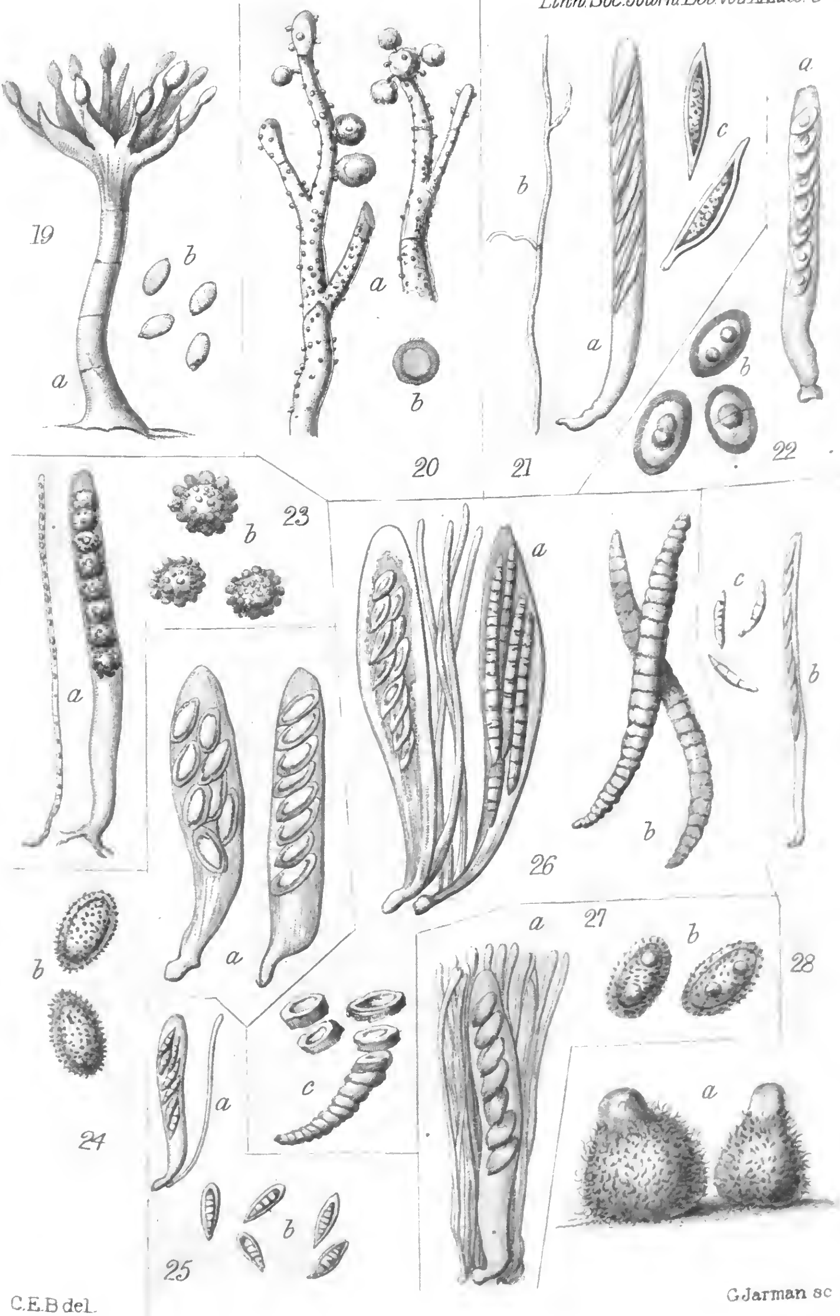
C.E.B. del.

G. Jarman sc.



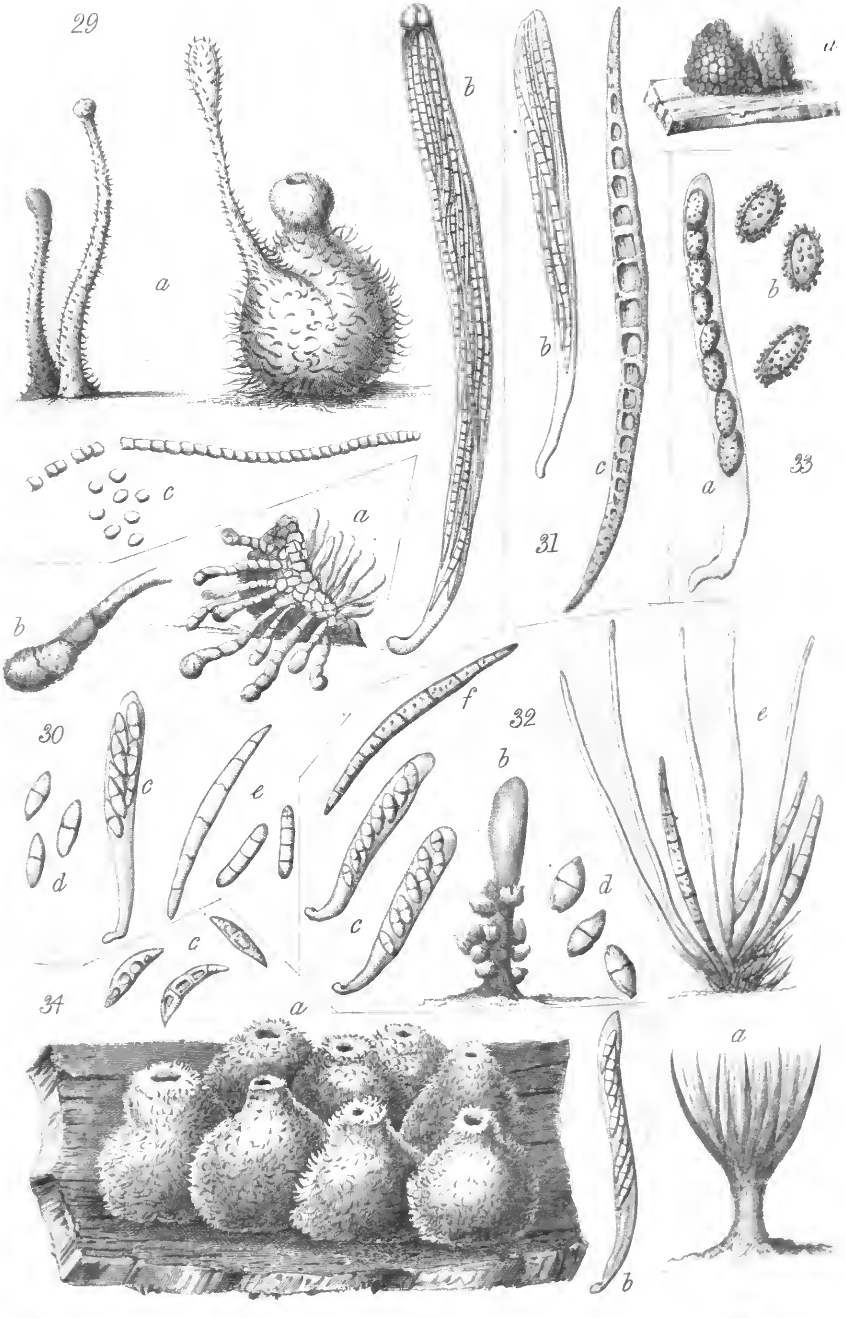
C. E. B. del.

G. Jarman sc.



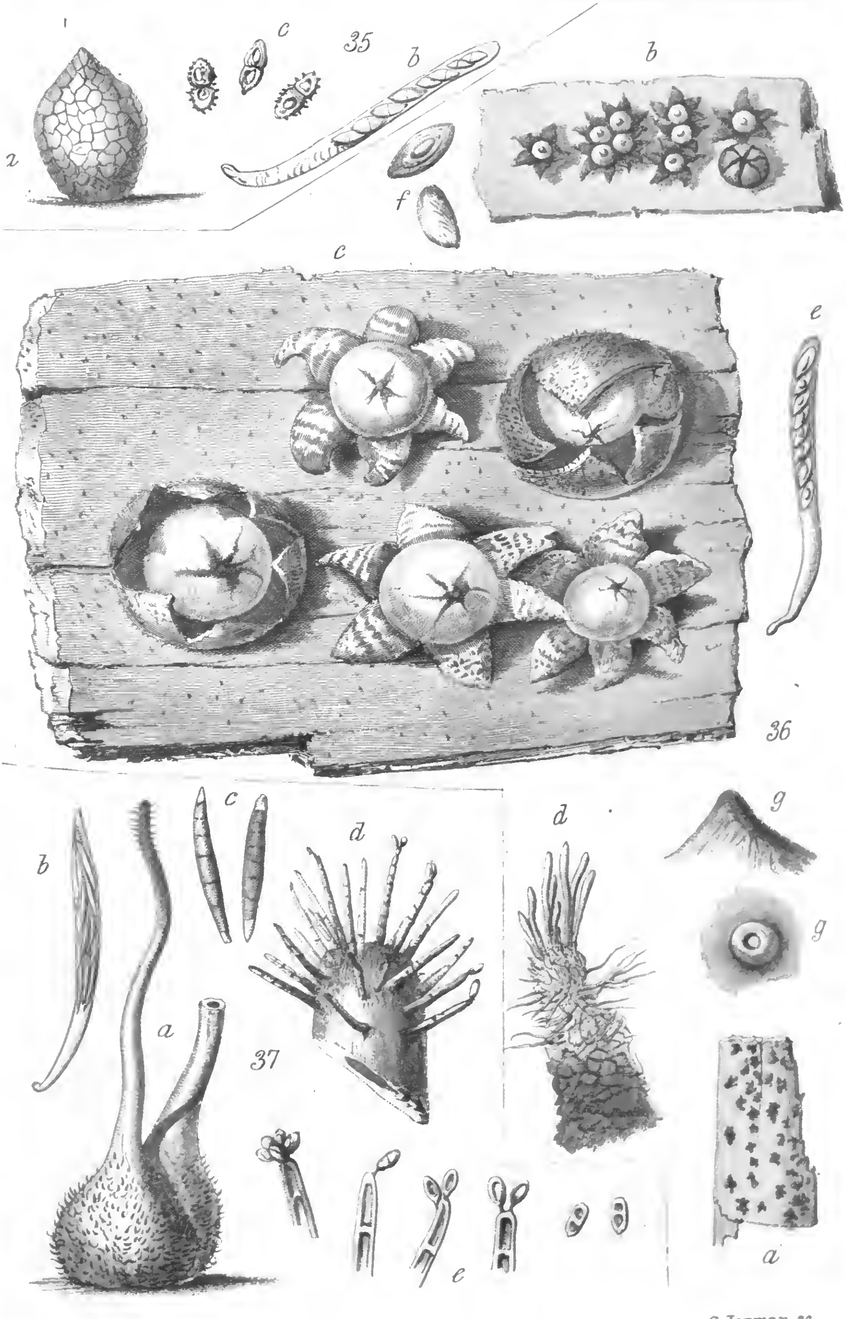
C.E.B del.

G. Jarman sc



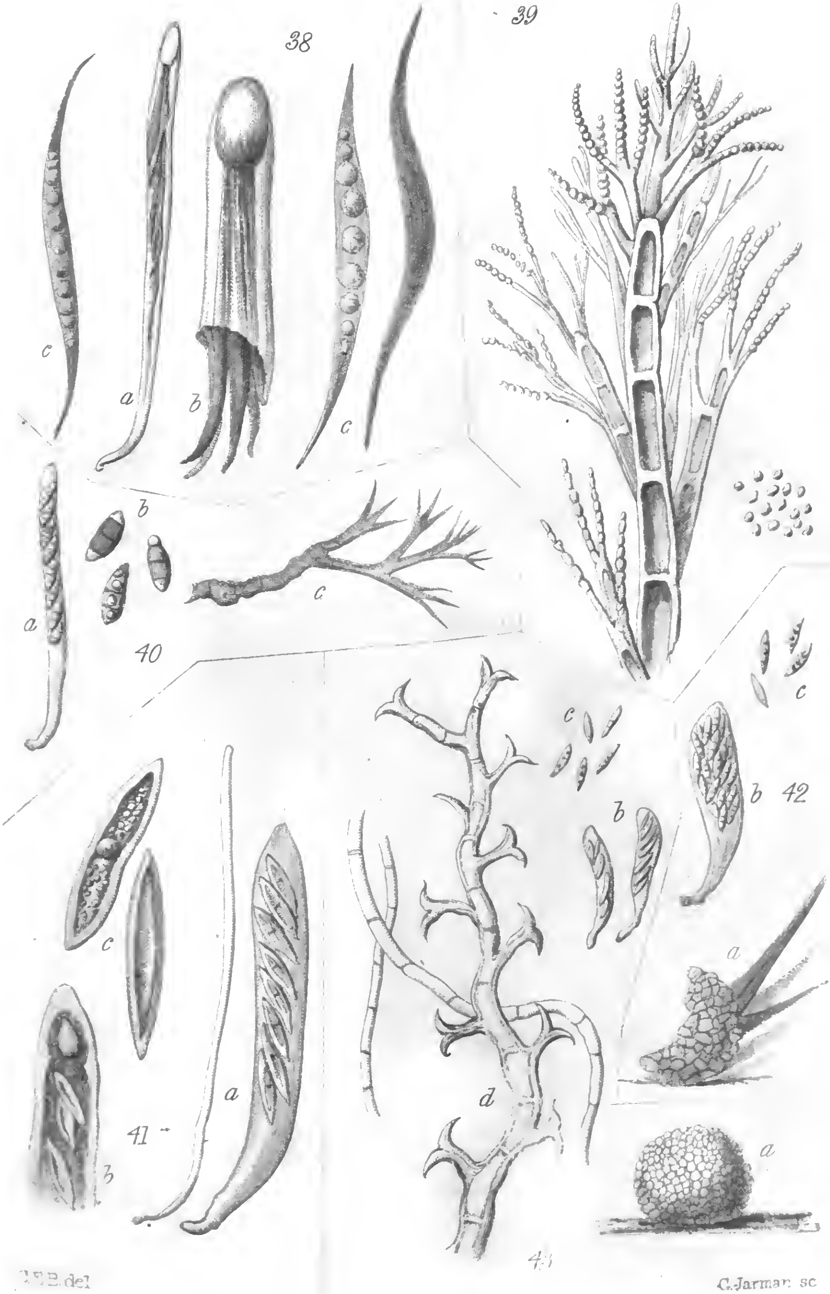
C.E.B. del.

G. Jarman sc.



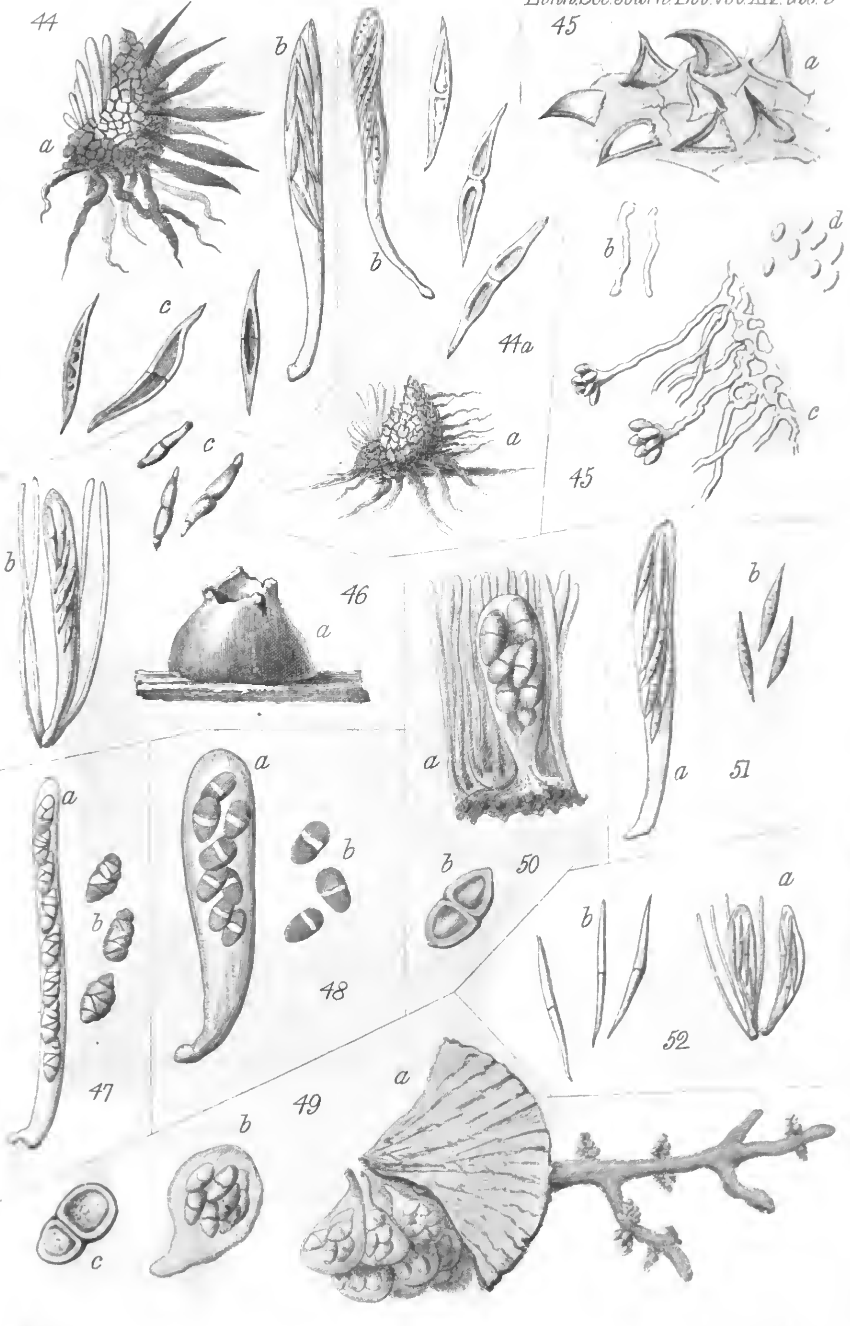
C.E.B. del.

G. Jarman sc.



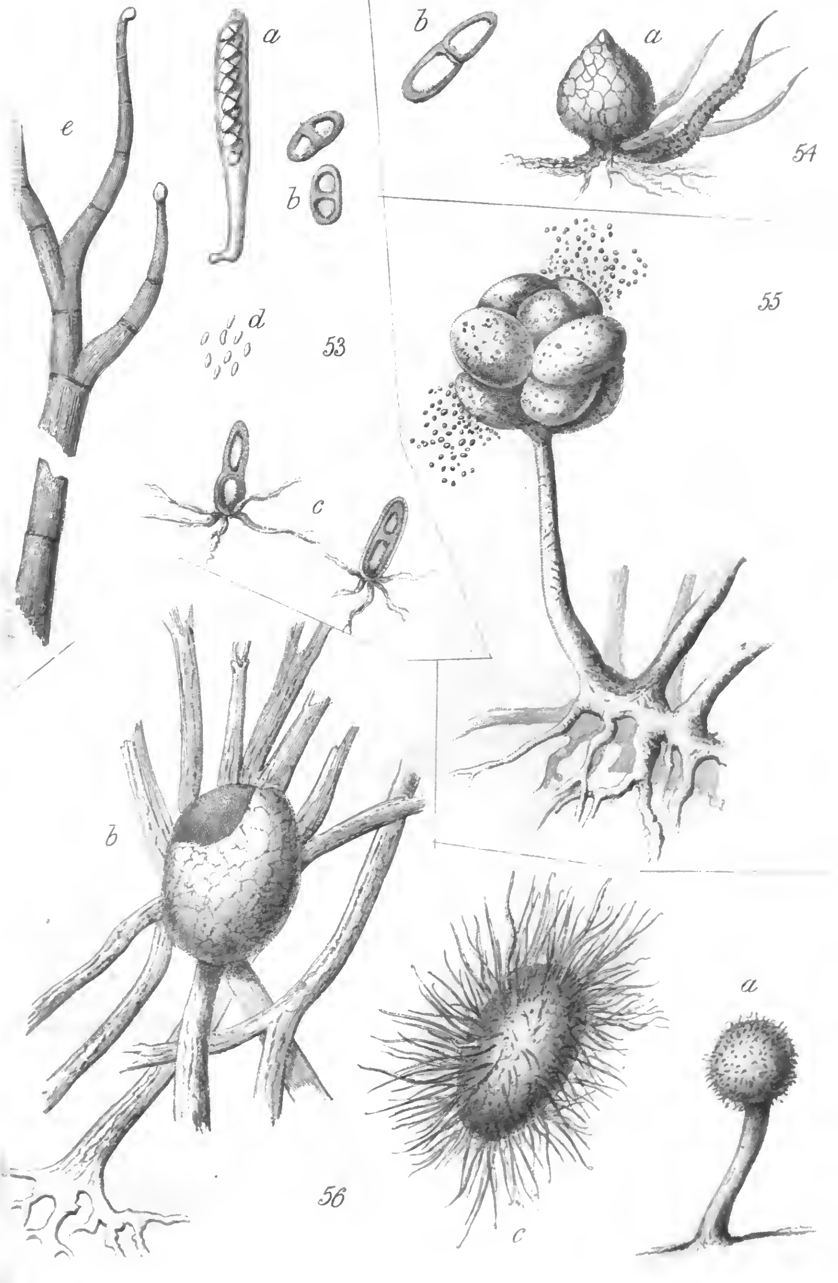
J. E. B. del

C. Jarman sc



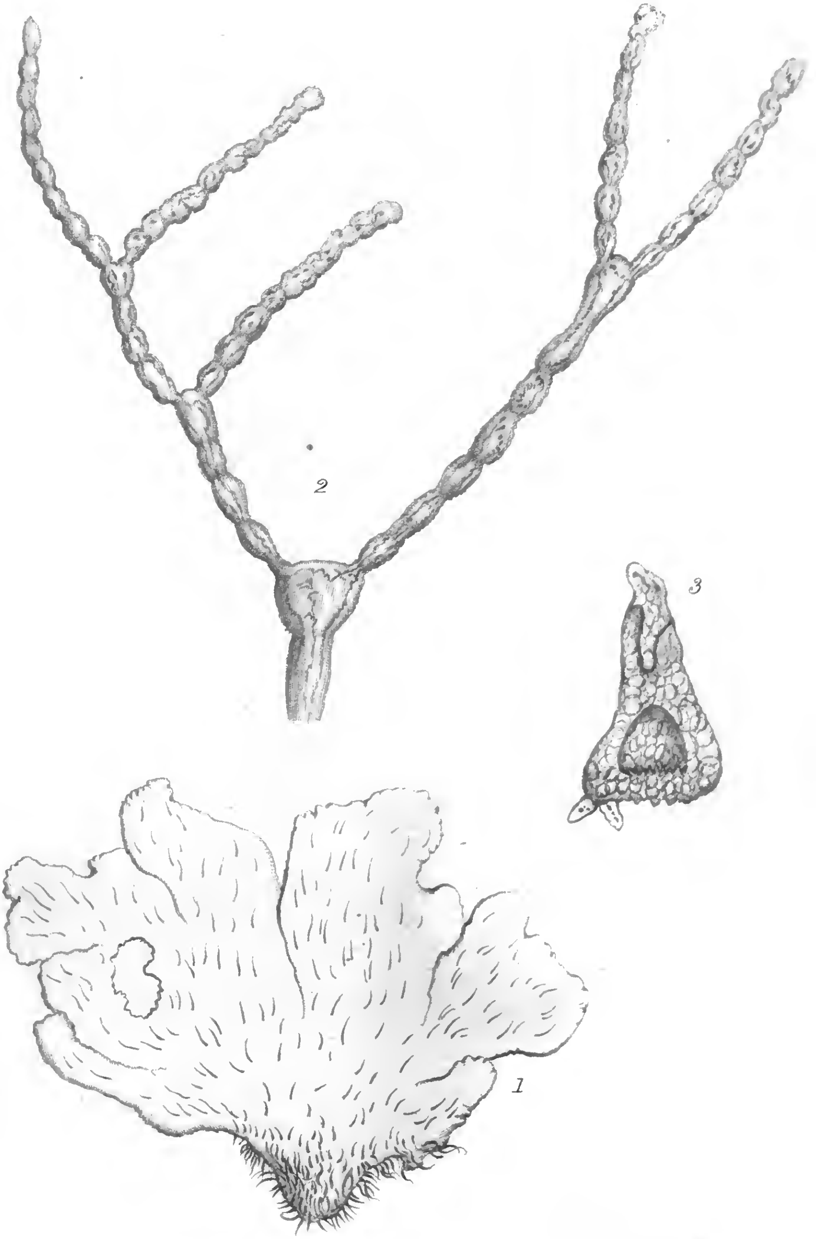
C.E.B. del

G. Jarman sc

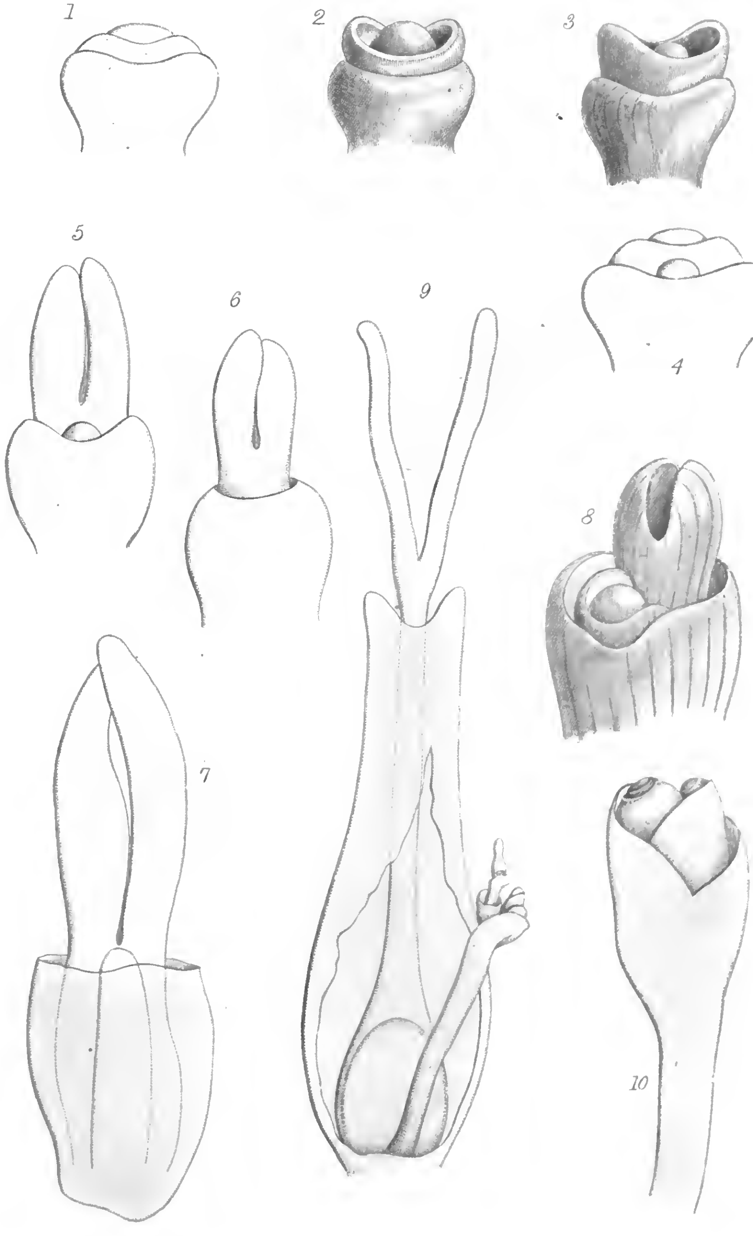


E.B. del.

G. Jarman sc.

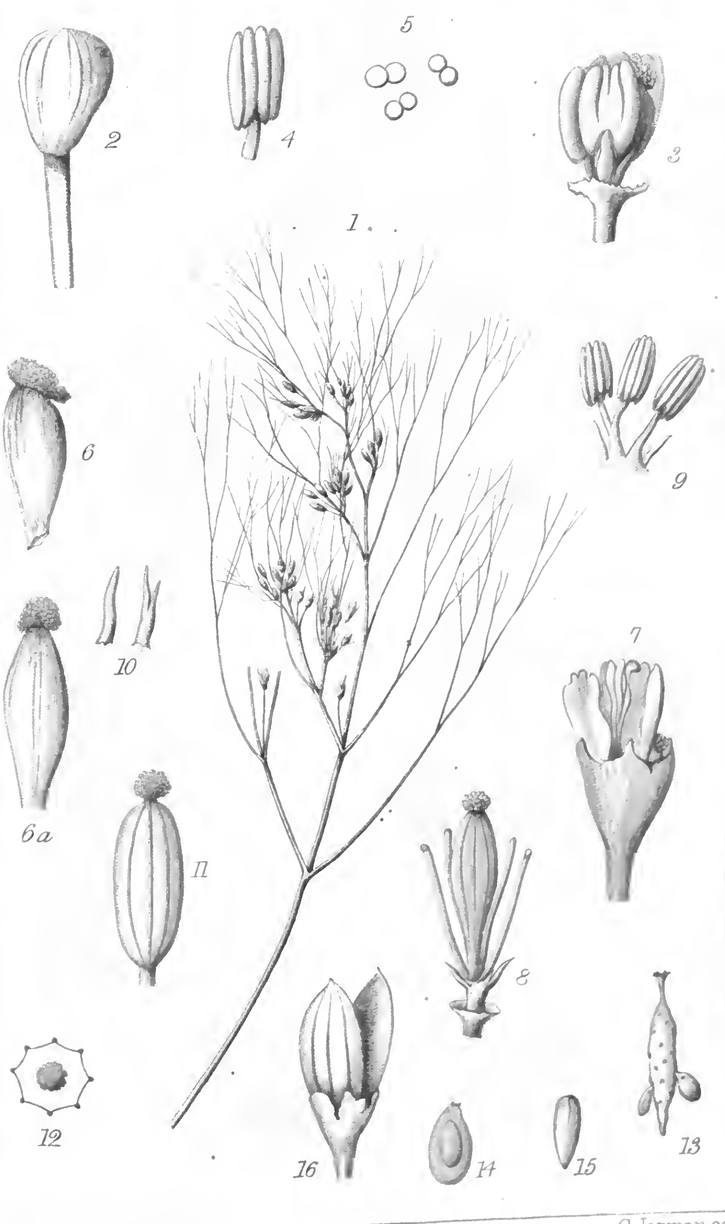


G. D. del.　　　　G. Jarman sc.



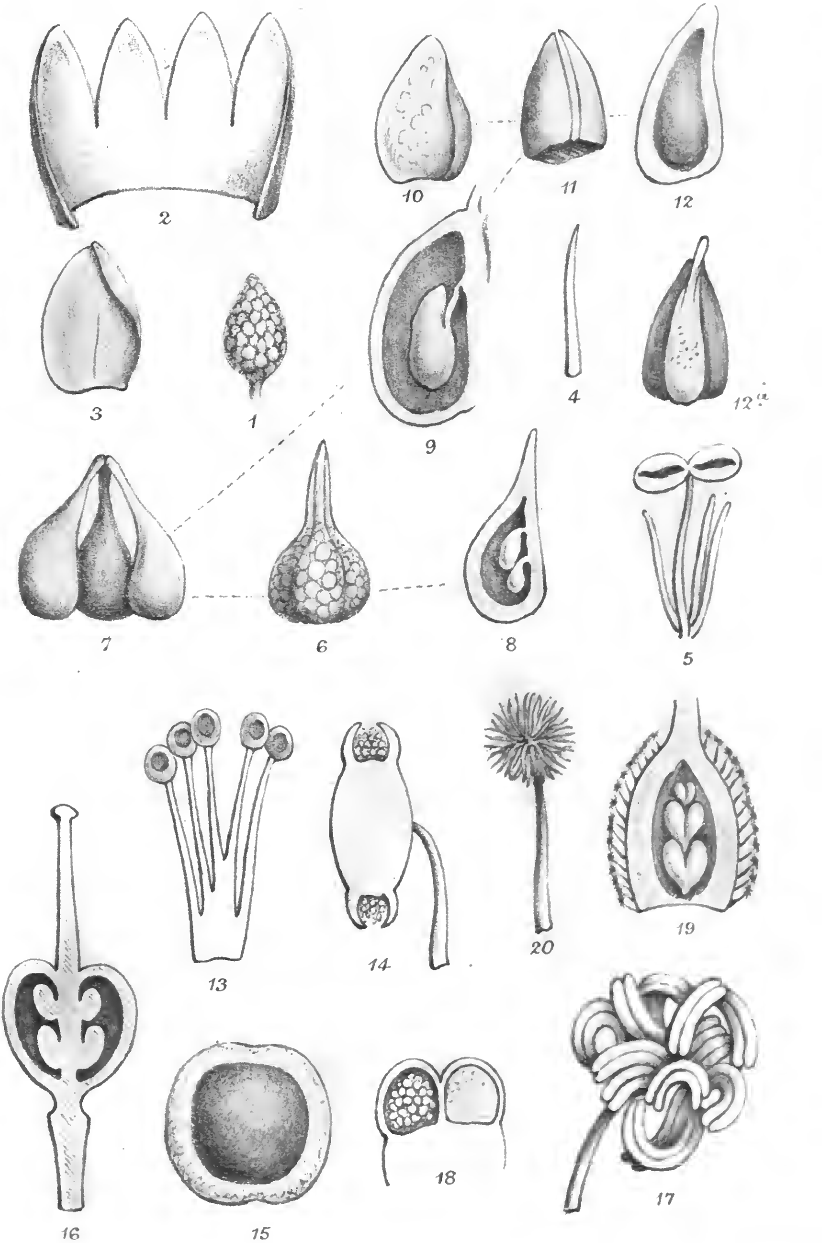
W.T.T.D. del.

G. Jarman sc



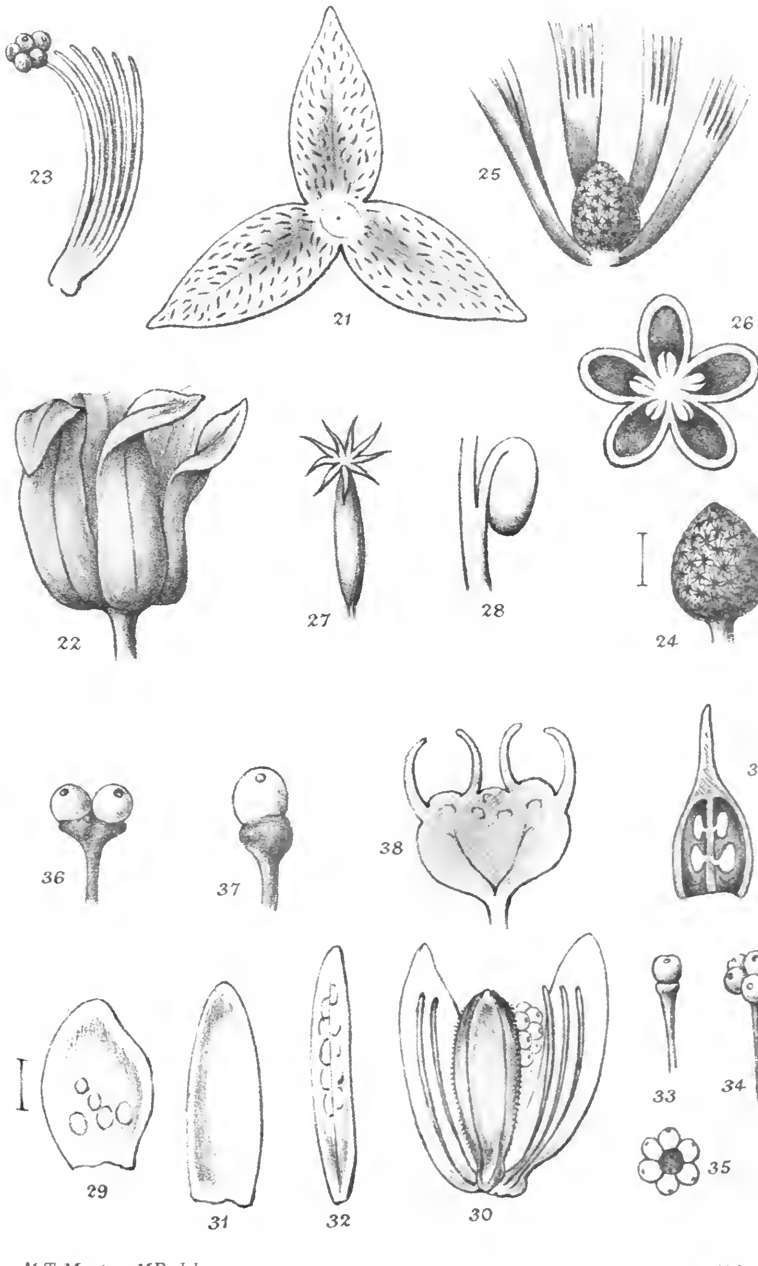
H. A. W. del.

G. Jarman sc.



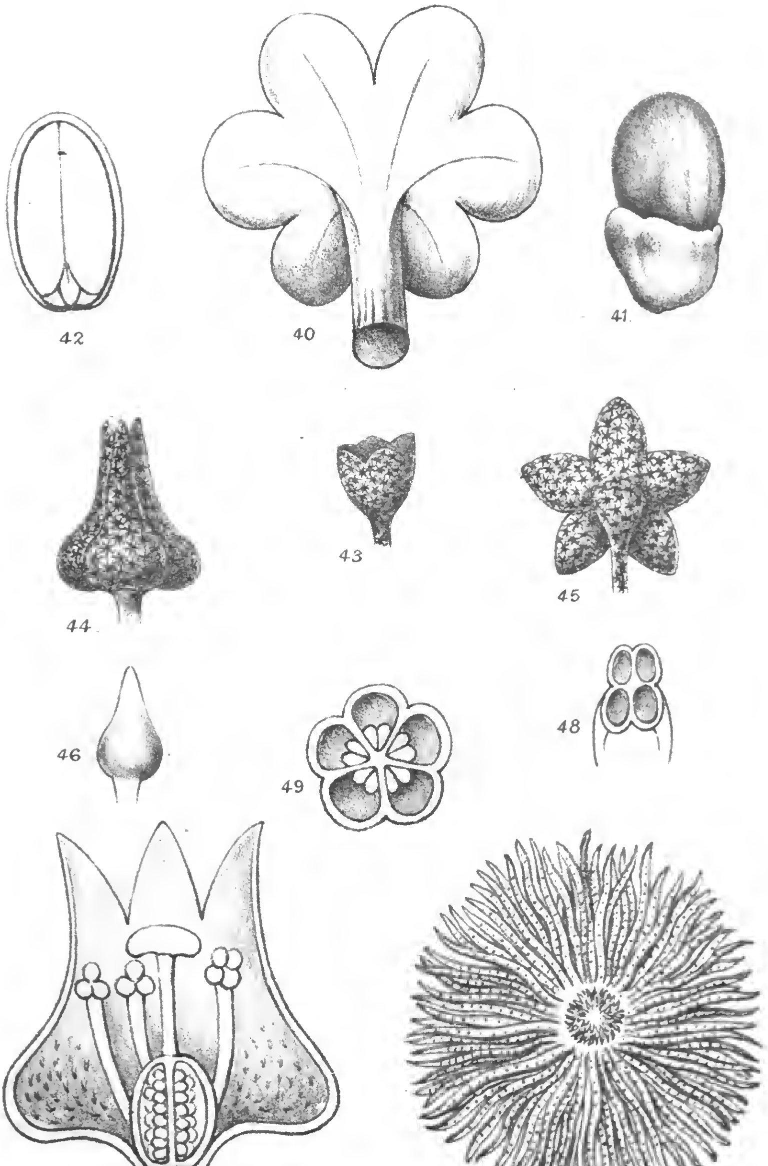
M. T. Masters M.D. del.
E. M. Williams F.L.S. lith.

W. West & Co imp.



M. T. Masters M.D. del.
E. M. Williams F.L.S. lith

W. West & C°. imp.

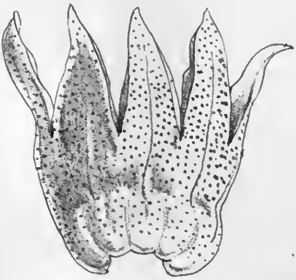


M. T. Masters M.D. del
E. M. Williams F.L.S. lith

W. West & C° im

Mrs. Baker, del. Fitch, lith.

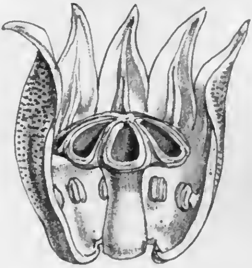
J. N. Fitch, imp.



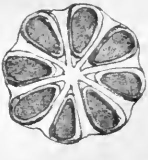
1.

2.

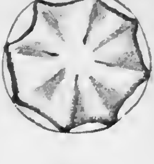
3.



4.



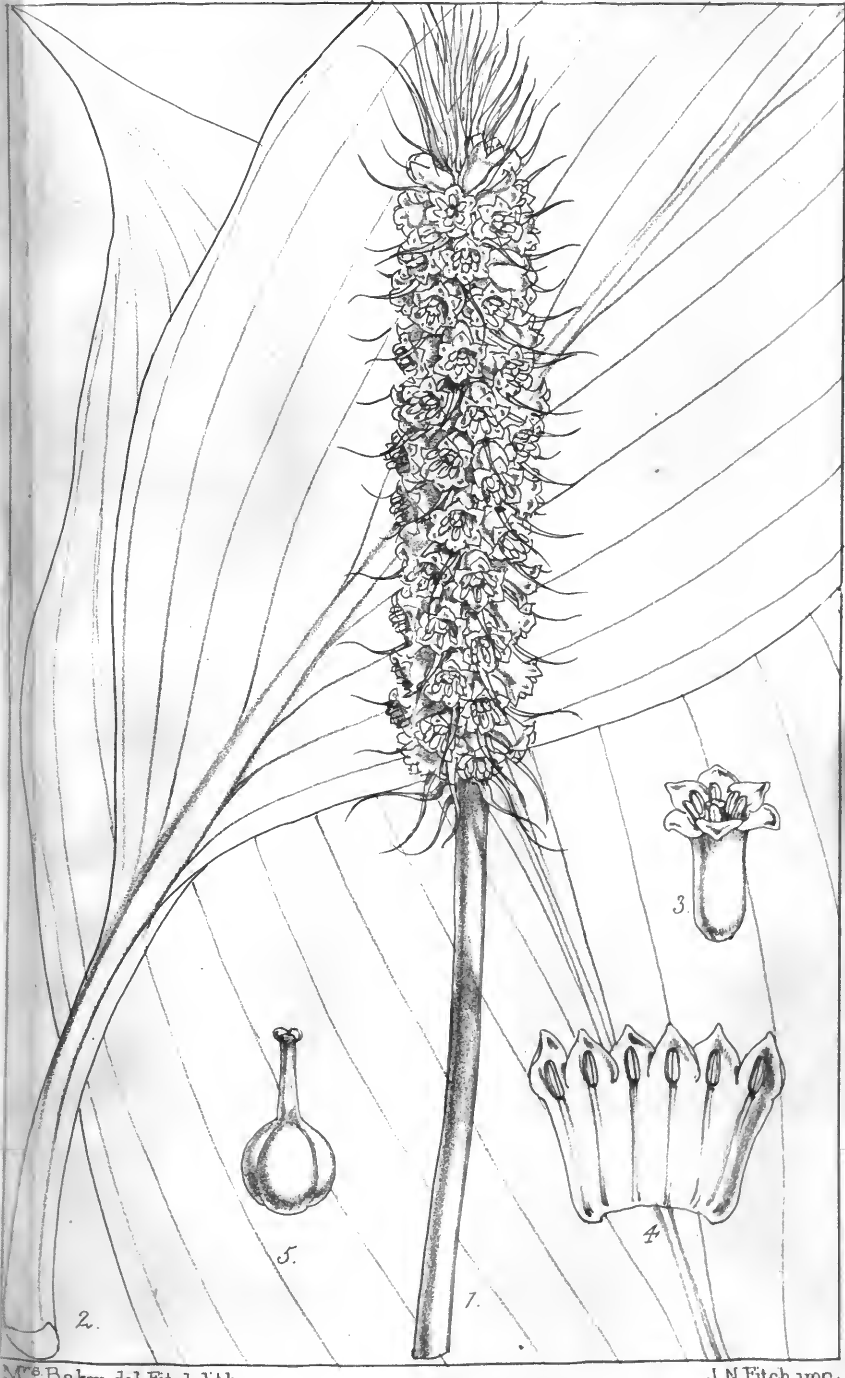
5.



6

M. Baker, del Fitch lith

J. N Fitch, imp



Mrs Baker del. Fitch, lith.

J. N. Fitch, imp.

Mrs. Baker, del. Fitch, lith.

J. N. Fitch, imp.